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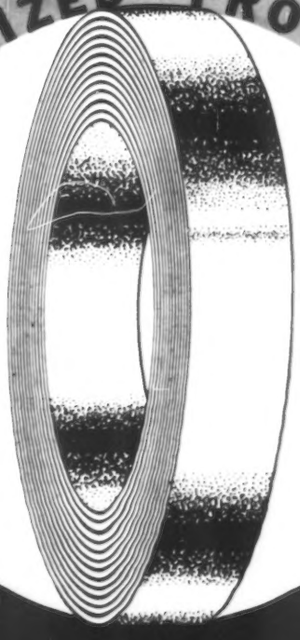

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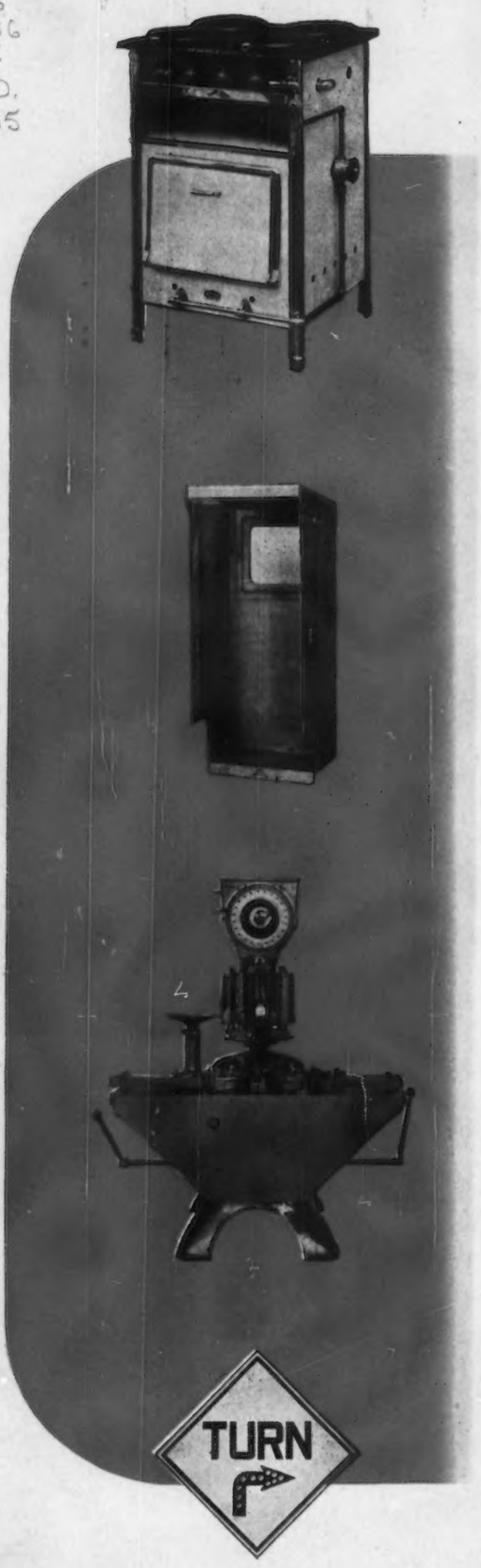

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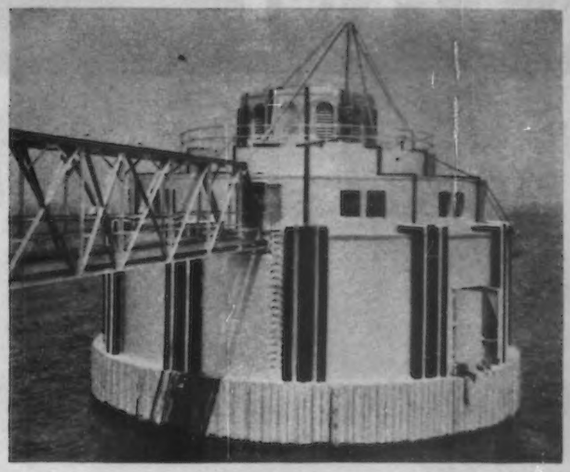

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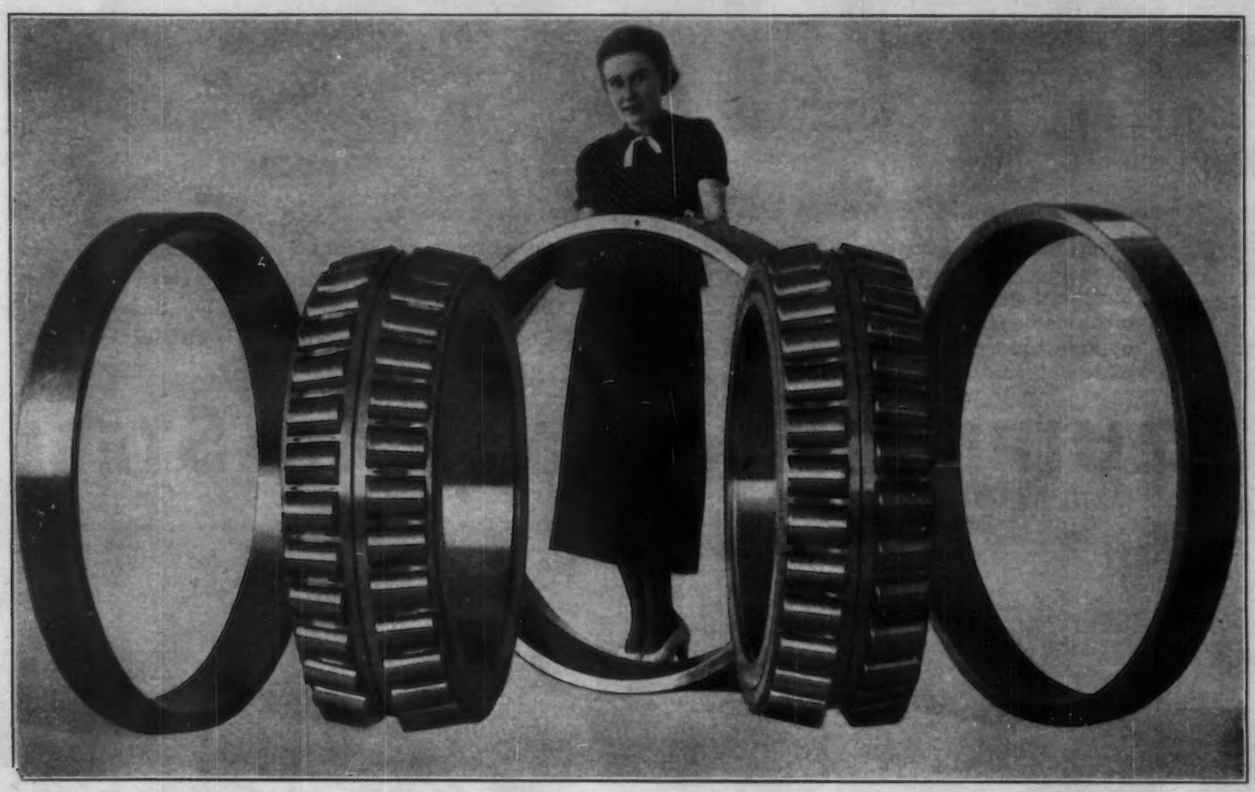

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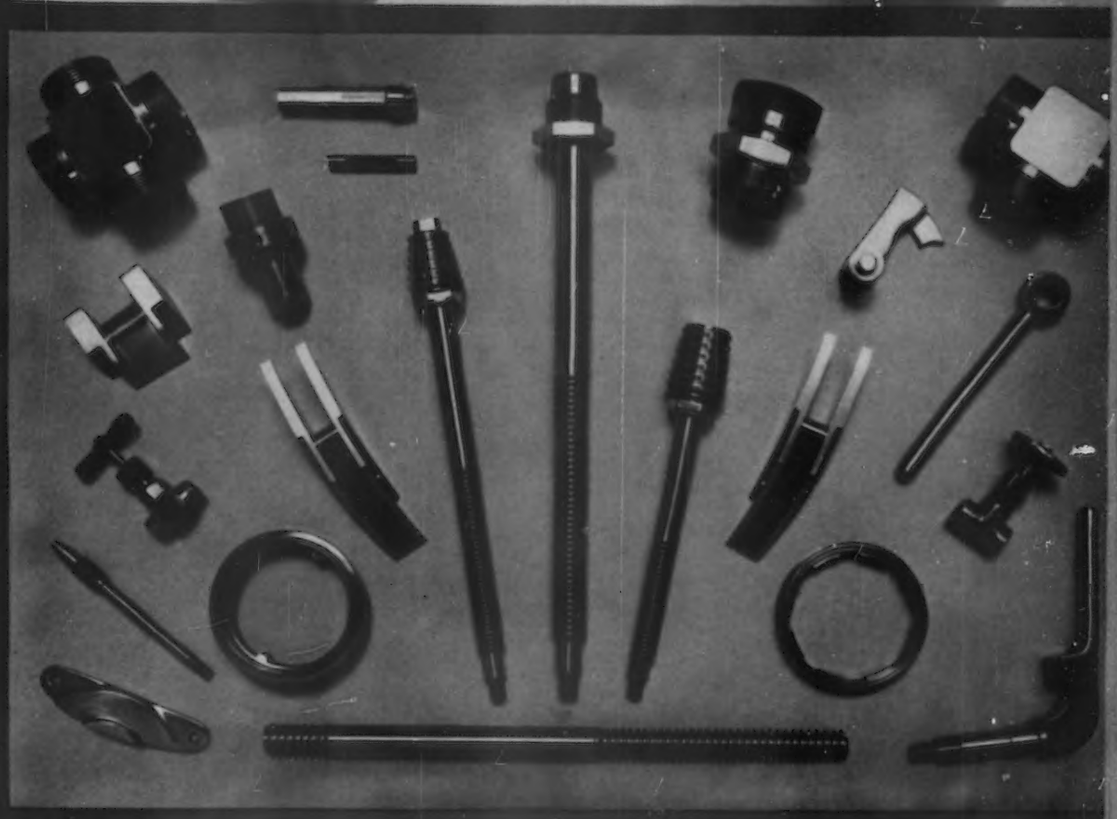

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Bethlehem also makes the lower-chromium-type steels of the stainless group, containing from 4 to 6 per cent chromium with various additions of molybdenum, tungsten and vanadium.

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BETHADUR 1

BETHADUR 1 is of the standard stainless-iron type. It possesses excellent corrosion-resisting properties in either the heat-treated or annealed condition. It is readily forged, can be machined without great difficulty, and may be heat-treated to secure high physical properties.

BETHADUR 2

BETHADUR 2 is the type commonly known as 18-8 stainless steel. It finds application where extreme resistance to atmospheric corrosion is required, particularly in ornamental parts which must retain their lustre over long periods of time without frequent cleaning and polishing. It is non-magnetic.

BETHADUR 3

BETHADUR 3 is primarily an acid-resisting steel and shows very little loss in weight when subjected to sulphuric or hydrochloric acid in mild concentrations. Therefore, it finds particularly wide use in chemical-plant apparatus, pickling equipment, and similar applications.

BETHADUR 4

BETHADUR 4 is similar to Bethadur 1, in that it requires no heat-treatment to bring out its maximum corrosion-resisting properties. Bethadur 4 is suitable for applications where high resistance to atmospheric attack is required, but where physical properties are relatively unimportant.

Bethadur 4 is particularly recommended for exterior trim, ornamental objects, and all other purposes not requiring the exceptionally high corrosion-resistance of Bethadur 2.

Bethadur 4 is the most malleable of all straight chromium-iron alloys. This property makes it particularly fitted for purposes where drastic cold work is encountered.

Bethadur 4 is an excellent heat-resisting steel. Under continuous service it will resist oxidation up to about 1200 deg. F., and will stand temperatures up to 1600 deg. F., for short periods of time without scaling.

BETHADUR 5

BETHADUR 5, with unusually high chromium content, is intended for use where exceptional corrosion-resistance is required, or dilute acids encountered. It is extensively used in the nitric-acid industry.

Bethadur 5 is sometimes used as a heat-resisting steel, though the higher carbon content of Bethadur 9 makes the latter alloy more desirable from a strength standpoint.

BETHADUR 6

BETHADUR 6 is the hardening grade of corrosion-resisting steel, sometimes called the cutlery grade. It is used in the manufacture of non-corroding parts that must be hardened.

BETHADUR 7

BETHADUR 7 has a high carbon content, making it suitable for parts in which a higher degree of hardness is needed. It is commonly used where hardness or abrasion-resistance is required in the presence of steam, water, salt water, mine water, oil and oil products.

Where extreme hardness is required the still-higher carbon Bethadur 8 should be used.

BETHADUR 8

WITH Bethadur 8 a maximum Rockwell "C" scale hardness of 60 can be obtained when the steel is quenched at temperatures in excess of 1850 deg. F. Other characteristics are the same as those of Bethadur 7.

BETHADUR 9

WHILE Bethadur 9, because of its high chromium content, is a corrosion-resisting steel, it is primarily intended for use in parts subjected to high temperatures.

Temperatures as high as 2100 deg. F. do not oxidize or scale the surface of Bethadur 9.

BETHALON

BETHALON A

BETHALON A, while easy-machining, possesses all of the excellent corrosion-resisting properties of straight carbon-chromium irons.

Bethalon A can be turned, drilled, bored or threaded as easily as ordinary screw stock, with the same tool set-up and the same feed, speed, and depth of cut. Excellent threads can be cut at 150 to 175 surface ft. per min.; it can be smooth-turned at 200 surface ft. per min.

BETHALON B

BETHALON B possesses corrosion-resisting properties equal to those of Bethadur 2, and is recommended for all uses where the rapid performance of intricate machining operations is important.

Bethalon B is not quite as machinable as Bethalon A, and must be machined at a somewhat lower speed than screw stock, though approximately twice the cutting speeds of standard 18-8 stainless can be used. The cutting speed is to some extent dependent on the type of screw-machine used, but speeds of from 80 to 90 surface ft. per min. can be maintained without the necessity for too frequent regrinding of tools.

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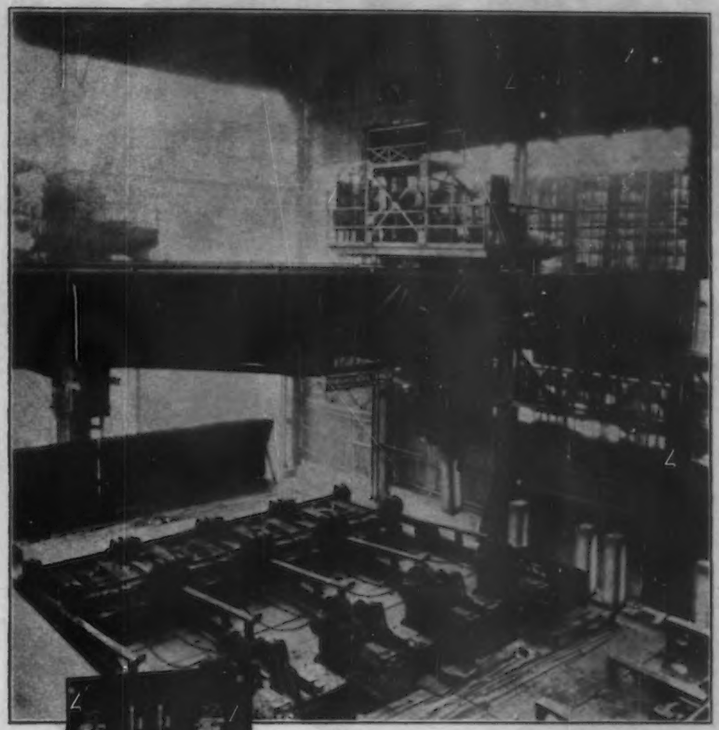

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OCTOBER 3, 1935

ESTABLISHED 1855 Vol. 136, No. 14

To the Keepers of the Pocketbooks

THIS editorial is addressed to the keepers of America's industrial pocketbooks; men who, by knowing when to say "no," have kept their companies' heads above water during the depression deluge of red ink.

Without doubt, gentlemen, your ability to say "no" to many suggestions for capital expenditures during the past four years was a life-preserver for the concerns whose assets you safeguarded. No doubt, too, even in so-called normal times, it is the part of wisdom to say "no" much more often than "yes." The two-letter negative will help you keep what you have got, but it takes the three-letter word yes, spoken at the right time, to get you more and make your company go places.

All of this is preliminary to opining that the time has arrived to say "yes" to intelligent plans for capital improvements.

One reason for this is that we are now in the early stages of what has the decided earmarks of a long-term cyclical upturn. Successful companies must make the bulk of their profits on the up-swings and attempt to hold position or curtail losses on the down turns. Of course, if you believe that the "brain trust" is going to do away with cycles, this argument will not have much weight but if you believe, as we do, that these cyclical causes are more powerful than the professors, you will deem it good business to put your houses in lowest cost, highest profit order early in the game.

Another reason for prompt action is that your money will buy more now than it will later on. Increasing demand and inflation will combine to bring this about. The index of machine tool orders, reflecting demand for a typical division of capital goods, has steadily increased from 62.3 in March to 125.8 in August of this year and undoubtedly will climb much higher during the coming months. As for inflation, we think that you will agree that no Administration can spend 40 billions of dollars in four years at the cost of an enormous deficit without driving down the buying power of its dollars.

Many other reasons for making capital goods expenditures could be cited, but perhaps example furnishes a stronger argument than precept. When a concern like the United States Steel Corpn., already committed to a capital expenditure program of seventy million dollars, announces that it is its intention to double that investment, **that** is real food for thought for you keepers of the pocketbooks.

J. H. VanDeventer

▲ ▲ ▲ Lubrication of Anti-Friction

IN the operation of machinery equipped with anti-friction (ball and roller) bearings, correct lubrication is of major importance. It ranks with correct mounting and the selection of proper type and size of bearing for its particular duty. Because the operation of anti-friction bearings is so simple and carefree, inadequate attention is frequently given to the subject of lubrication.

It is little wonder, however, that the subject of lubrication is frequently not given the attention that it deserves because a review of the writings on the subject reveal many conflicting opinions as to the proper type of lubricants and methods of application. But it is pretty generally agreed by both the users and manufacturers of these bearings that the patent function of a lubricant for these is a fourfold one:

1. To protect the accurately and highly polished surfaces from rust and wear
2. To minimize friction between the stationary and moving parts
3. To aid in the dissipation of heat generated by the deformation of the load-bearing parts and by friction
4. To form a supplementary seal between stationary and rotating parts, which prevents the ingress of dirt, dust and other abrasive materials and minimizes the leakage of lubricant from the bearing.

Anti-friction bearings are accurately made; tolerances are frequently held to limits of 0.0001 in.; surfaces are ground and lapped to ultra-fine finishes. Naturally, such surfaces are susceptible to rust unless protected at all times by a correct neutral lubricant.

Rolling friction is of much the same nature as sliding friction. Upon perfectly rigid plane surfaces the friction of rolling would be zero but such surfaces, of course, cannot be produced and inequalities remain, which interlock and thus offer resistance to free motion. Furthermore, pressure causes a slight deformation both to the surfaces of the races and that of the ball or roller; so that contact takes place not on a point or line but on a more or less circular or narrow rectangular area. As the ball or roller moves along fresh portions of the surfaces distortion occurs and sliding takes place.

This action may be made clearer by referring to Fig. 1, which shows a hardened steel ball rolling on a plane rubber surface. The ball sinks into and compresses the rubber immediately under it. The rubber forced up on the front slides over the surface of the ball in the reverse direction to the motion of the ball, thereby hindering its motion. Likewise, as the ball leaves the pile behind, the rubber returns to its original place and again slips over the ball in a direction opposite to its motion. Thus

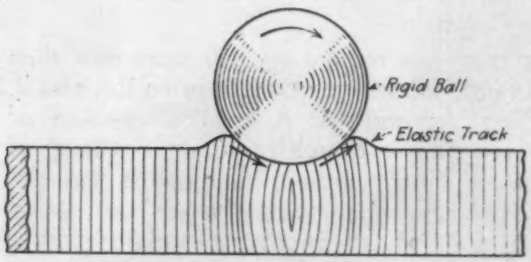


FIG. 1—Showing "creeping action" between a rigid ball and an elastic track. Note that the creep is always in the opposite direction to the motion of the surface of the ball.

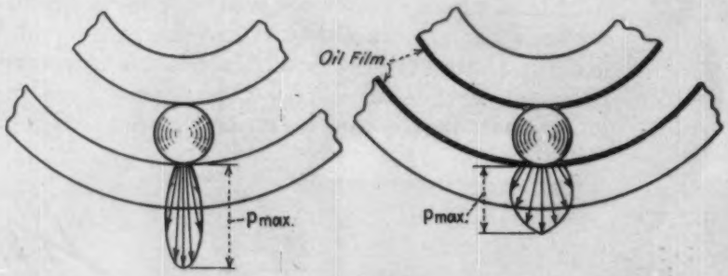


FIG. 2—How an oil film aids in distributing the load over a greater area, thereby decreasing the maximum intensity of pressure to a considerable degree.

Bearings

By JAMES I. CLOWER
Assistant Professor of Machine Design
Virginia Polytechnic Institute

CORRECT lubrication of anti-friction bearings is of major importance, ranking with correct selection of type and size, and proper mounting. This article, by Professor Clower, deals with the functions of a lubricant for such bearings, properties of the lubricants required for various operating conditions, and factors affecting selection of lubricants. Charts show the type of lubricant for various operating conditions.

the resistance to rolling is due to sliding of two surfaces and is fundamentally the same as that found in a plain bearing and slides, such as guides, cross-heads, etc.

Because of the stretching of the path over which the ball rolls, the actual length of the path rolled over is greater than the horizontal distance traveled by the ball. Hence it does not move its true geometrical distance. The amount that it falls short depends mainly upon the hardness of the surfaces. Even with hardened balls and races, this slip is quite formidable, and unless the bearing is correctly lubricated excessive wear results.

In addition to the sliding between the ball or roller and its races, sliding action also occurs between the ball or roller and the retainer. Points of such sliding are clearly shown in Figs. 3 and 4.

Characteristics Required of Lubricants

The required characteristics of a lubricant for anti-friction bearings may be listed as follows: (a) High film strength (See Fig. 2); (b) maximum oiliness; (c) freedom from abrasive materials; (d) freedom from solidifying matter; (e) minimum gum-forming tendencies; and (f) minimum tendency to absorb moisture.

In all types of anti-friction bearings, the load-bearing area is so small as to produce an exceedingly high unit pressure which will rupture the lubricating film, thereby permitting metal-to-metal contact, which results in excessive wear and noisy operation, unless the lubricant possesses film strength to an unusual degree. If the lubricating film does not fail it aids in distributing the load over a larger area, thus reducing the maximum pressure between the contacting surfaces, as shown in Fig. 2. It also cushions the balls or rollers as the load is alternately applied and removed each revolution.

Under severe loading conditions such that the film is ruptured the property of oiliness is of prime importance, for under such conditions the film is an absorbed one. A lubricant may possess a high film strength, but at the same time it may be deficient in oiliness, or conversely it may possess oiliness to a high degree but lack film strength.

Obviously, lubricants used in

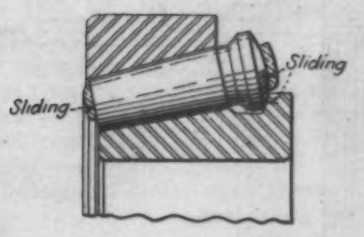
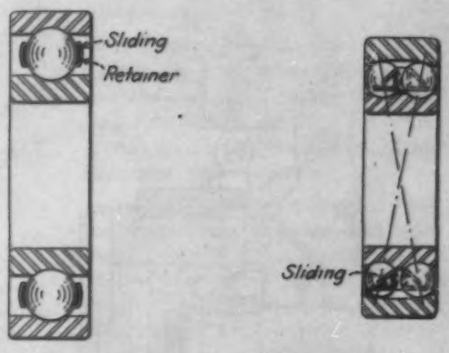
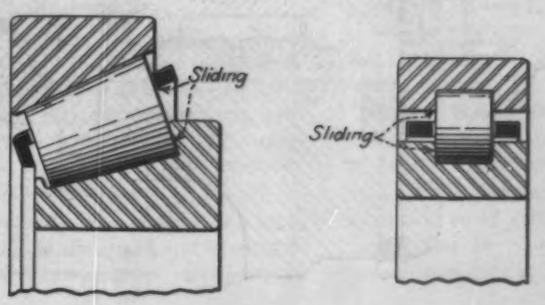


FIG. 3—Points where sliding contact occurs in various types of roller bearings.





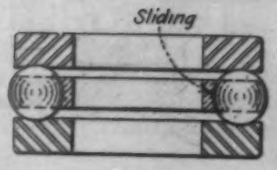


FIG. 4—Points where sliding occurs in a few types of ball bearings.

anti-friction bearings should be free from abrasive materials that tend to act as lapping compounds. Most lubricants are free from such materials when they leave the refinery, but in too many cases they become contaminated through careless handling. Drums and other containers are left uncovered; pressure-gun connections are seldom if ever cleaned; oil retainers and seals are permitted to become worn excessively, thereby permitting the ingress of dust and dirt. In repair work bearings are frequently washed in dirty gasoline containing iron oxide, quartz, silica and other abrasive materials. For long-continued service anti-friction bearings demand clean lubricants.

Solidifying matter not of an abrasive nature tends to clog oil passages and ducts and the bearing itself, thus causing unnecessary wear and friction by retarding the free movement of the balls or rollers. Gummy residue formed by the lubricant itself when subjected to high temperature and speed conditions act in a similar manner.

Moisture is decidedly detrimental to anti-friction bearings, and its presence even in very small quantities will cause rapid corrosion. For this reason lubricants intended for these bearings should be strongly resistant to moisture absorption.

Lubrication Factors

In selecting a lubricant for anti-friction bearings six factors in general are to be considered, namely: (a) design of housing; (b) operating temperature; (c) speed; (d) load; (e) size; (f) method of application.

HOUSING DESIGN: Housings for anti-friction bearings vary in construction, depending mainly on whether or not oil or grease is to be used for lubrication. It is generally believed that oil is a more efficient lubricant for these bearings than grease because of its lower fluid frictional resistance. It is, however, more difficult to prevent from leaking out of the housing, which leakage not only causes a loss of lubricant but also an unsightly appearance and in some instances damage to parts such as commutators and electrical insulation. Oil therefore requires a more complicated housing design, which is, of course, more expensive. Moreover, oil-lubricated bearings in general require more oil-servicing than grease-lubricated ones.

OPERATING TEMPERATURES: In selecting a lubricant for anti-friction bearings operating temperature is of prime importance, because viscosity of oils and the consistency of greases decrease rapidly as temperature increases. For example, a certain oil which is widely recommended for these bearings has a viscosity of 285 sec. Saybolt at 100 deg. F. and only 128 sec. Saybolt at 130 deg. F. Thus while the temperature increases only 30 per cent the viscosity decreases 55 per cent, which is a formidable decrease. A lubricant therefore that may be perfectly satisfactory at normal operating temperatures would quite likely be unsuitable at lower or higher temperatures. Surrounding temperatures below 32 deg. F. require an oil of low pour test (—15 deg. F. or lower) and of relatively low viscosity in order to insure ready distribution at starting. Operating temperatures above 150 deg. F. require the use of an oil of heavier body.

Similar considerations must be

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FIG. 6—Wick-feed oiling on ball-bearing grinder spindle.

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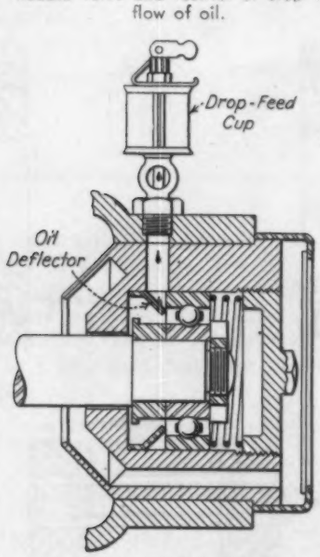
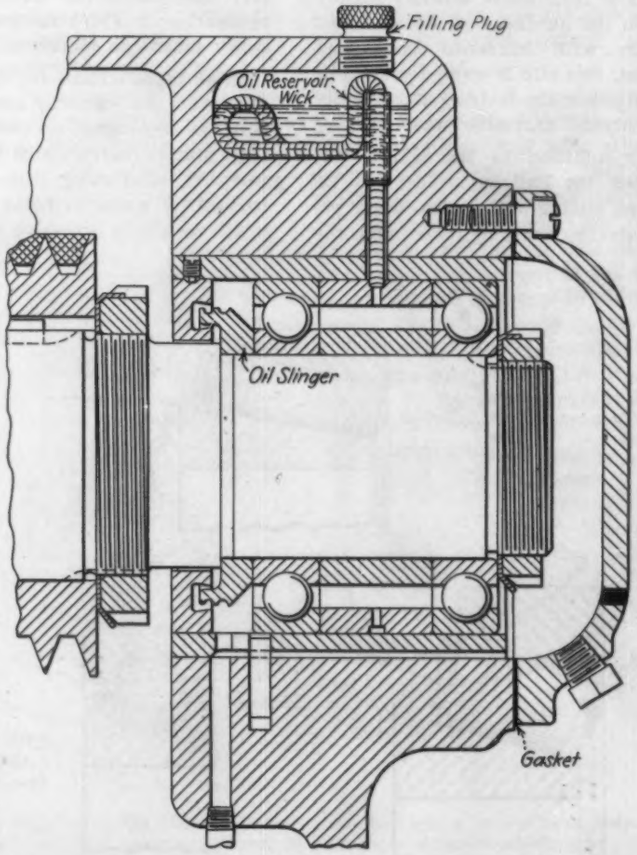
BELOW

FIG. 5—Drop-feed oiling successfully applied to a high-speed motor. Care must be taken to prevent dirt from getting into the drop-feed cup, because a small particle will clog the needle valve and restrict or stop the flow of oil.





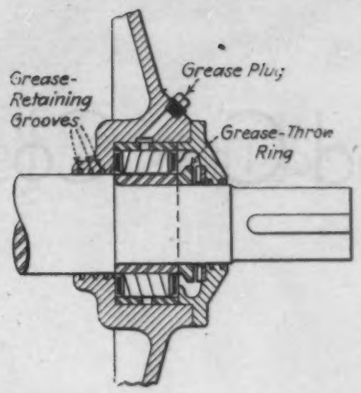


FIG. 7—Synchronous motor grease-lubricated roller bearing. Grease is applied by means of a gun.

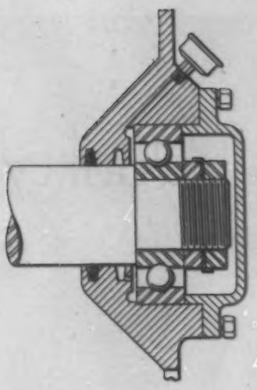


FIG. 8—Grease-lubricated ball bearing. Anti-friction bearings should not be filled more than half full of lubricant. Excess grease causes heating and leakage.

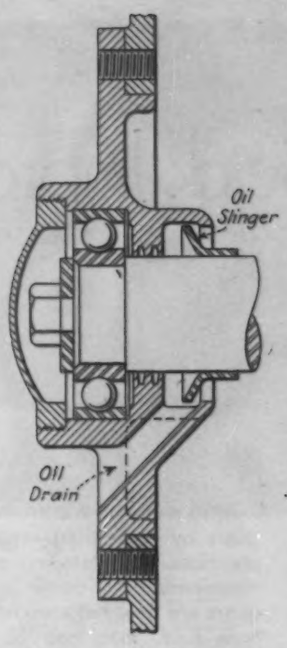


FIG. 9—Method of preventing oil from leaking through housing. A simple stamped steel slinger on the shaft throws any oil that leaks by the closure into the annulus and escapes through the drain.

given to the selection of greases. Low temperatures (below 32 deg. F.) require a soft or medium consistency grease for quick distribution, while high temperatures (above 150 deg. F.) a soda-soap grease of hard consistency (No. 3) and of high grade so as not to "bleed" or "separate." If a low-quality grease is used and bleeding occurs the free oil may be thrown out of the bearing by centrifugal force, thus leaving in the bearing only the soap filler which gradually becomes dry and possessed of little lubricating quality. Moreover, hardening and drying of some greases is accompanied by rancidity and a consequent increase in the free fatty acid content of the soap filler which causes corrosion. This, however, can be overcome by the use of high-grade greases, which will not deteriorate with age and service.

Water, which is used in the manfacturing of grease soaps, must be completely eliminated from the finished product, because its presence will cause hydrolysis, resulting in rapid decomposition of the grease and a consequent increase in the acidity.

The operating temperature of anti-friction bearings depends on many factors. The most important ones are: (a) load; (b) speed; (c) proportions of the housing and support; (d) surrounding air temperatures; (e) ventilating conditions; (f) quantity of lubricant supplied the bearing.

Obviously, the greater the load, the higher the speed and surrounding air temperature the greater will be the operating temperature of the bearing. On the other hand, the more massive the housing and support and the better the ventilation the lower will be the operating temperature, other things being equal.

Not the least of these factors, however, is the quantity of lubricant. In fact, after the bearing has been installed, this is the only controllable factor. A too meager or an over-supply will in either case cause overheating. Under-lubrication means metal-to-metal contact, resulting in rapid wear and consequent heating and early replacement. Over-lubrication, especially in the case of grease, will also cause an early replacement of the bearing, but due to other reason than wear. If an over-supply is used the bearing will overheat because of excessive fluid friction. Such overheating causes expansion and consequent binding of the balls or rollers with their races. Such expansion tends to loosen the inner race from the shaft, permitting it to move relative to the shaft. Because the race is made of alloy steel hardened and the shaft is generally a soft steel, the shaft will wear rapidly, thus permitting misalinement and pounding. Similarly, the outer race may become loose in the housing and similar results follow.

SPEED: Speed and temperature are related, temperature in part being the result of speed. High-speed conditions require that if oil is used it be of sufficiently low viscosity and be used sparingly in order to minimize fluid frictional resistance, thereby preventing overheating. Likewise, if a grease is employed, it must be of soft consistency for the same reason. Experience has proved, however, that an extremely hard grease may be used successfully at extremely high speed, say above 10,000 r.p.m. The action in this case is that the grease channels and a sufficient amount of oil for lubrication "sweats" from the grease. It must be remembered, however, that the grease used in this case must remain quite hard at the operating temperature.

In general, however, oil is preferable for high speeds and grease for low speeds. Whether the dividing line is 1000 or 2000 r.p.m. depends mainly on the method of application and closure.

In connection with speed it must be remembered that ball and separator speeds are a more reliable index of the lubrication requirements than shaft speed, because bearings of two or more different sizes may be mounted on the same shaft or different shafts operating at the same speed. For example, a certain bearing mounted on a shaft operating at 2500 r.p.m. might be splash lubricated, whereas a larger bearing operating at approximate-

(CONTINUED ON PAGE 86)

Buick Improves Quality and Cuts Costs

BUICK has improved quality and lowered costs of crankshafts and transmission gears by revamping forging practices and installing new machinery. All transmission gears are now hot pierced, a hole 7 in. long and 55/64 in. in diameter being pierced in countershaft gears. Both crankshafts and gears are forged from billets instead of bar stock. Use of four steam drop hammers of unusual rigidity makes possible production of crankshafts to closer limits. Materials are handled economically.

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CRANKSHAFTS and transmission gears of improved quality are being made at lower costs for Buick passenger cars as a result of the revamping of forging practice and installation of new equipment in the forge shop of the Buick Motor Co. at Flint, Mich. The modernization of the forge department is part of Buick's program of expansion and rehabilitation which has involved an expenditure of $14,500,000 during the last 18 months. Of that sum nearly $700,000 has been spent in revamping forging processes and in purchasing new machinery.

Of chief interest are four steam drop hammers each of 12,000-lb. capacity. The rigidity of the anvil, frame and tie plate structure of these hammers, used in forging crankshafts, makes it possible to produce forgings to close limits, thereby insuring better uniformity of the dimensions of the finished crankshafts. This, in turn, means that the four-bearing crankshafts used in 1936 Buicks set up practically no torsion and strain in the motors and contribute to a smoother operating car.

The fine performance of these hammers has made possible a reduction in the draft angle of the crankshafts from 7 deg. to 3 deg. or less, with a consequent saving of considerable proportions in machining cost, since there is less machining to be done. A notable change in forging procedure is the straightening of crankshafts while hot instead of cold, just as they come from the high-temperature, heat-treating furnace. Crank-

CRANKSHAFTS are given 10 to 15 blows in this 12,000-lb. steam drop hammer. They then are transferred to special fixture (at right) where counterweight edges are cooled in water to avoid distortion in trimming flash (in Toledo press, at extreme right). Workman at left uses portable steam hose to remove scale from work during forging operation. Note fan to cool operator and monorail carrier to move crankshaft by hand hoist.

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Of Forgings

ROBERT H. DARNTON
Superintendent of the Forge Division
of Buick Motor Co.

shafts thus go into the straightening press at a uniform temperature and the resulting shrinkage is uniform, imparting to them a permanent set which is not changed by later machining operations. The uniformity of the crankshafts as they reach the finishing departments likewise cuts down machining expense.

Another departure from normal forging practice is to be found in the piercing of all transmission gears instead of forging them as solid blanks with the center hole to be drilled later. Buick has discovered a refinement in quality and a lowering of costs in this method. The progressive piercing operations expand the metal outward uniformly, thus maintaining a very desirable grain structure. They also make possible the centering of all machining work from the rough pierced hole after it is broached. Other advantages of piercing are the lowered cost of machining and a reduction of distortion in the final hardening of the gears.

Efficient methods have been devised for handling materials in the forge shop. Forgings are carried from one operation to the next in large metal tote boxes hauled by gas-electric trucks, except where operations adjoin one another and transportation by truck is unnecessary. Wherever feasible, work on certain parts is grouped so as to hold down movement of materials to a minimum.

In connection with some forging operations, such as the piercing of the countershaft gear stock, large pits have been built in the floor alongside the forging machines. Tote boxes are lowered into these pits by overhead crane and the work discharged into them from the forging machine. When filled, the boxes are picked up by the crane and set on the shop floor, being taken by truck to the succeeding operations.

AFTER being heat-treated in continuous pusher-type furnace (left), crankshafts while hot go through a 600-ton hydraulic setting press to aline pins and bearings and straighten cheeks.

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On all work where the material is cut to length, the forging length is maintained by the use of tongs gripped in the dies of the forging machine as an insert. A porter bar instead of tongs is used by the operator to hold the bar stock in the second forging machine in which transmission gears are pierced.

Contrary to the usual practice of using bar stock to make crankshafts, Buick employs round-cornered square billets ranging from 4 to 4¼ in. in thickness, from 32 to 40 in. in length, and from 141 to 220 lb. in weight, according to the size of the crankshafts to be forged. The steel is General Motors No. 1045, the carbon content of which is 0.40 to 0.50 per cent.

After being sheared to length, billets are heated in a continuous pusher-type forging furnace designed and built by Buick. This furnace, which is oil fired by five burners, heats the steel to 2300 deg. F., each billet being in the furnace 1 hr. 20 min. Near the discharge end of the furnace is a side door through which hot billets are taken out and put through a Clearing press to provide a tong hold for the operator of the large drop hammers in which the steel is shaped into crankshafts. From the press, billets are returned to the soaking zone of the furnace.

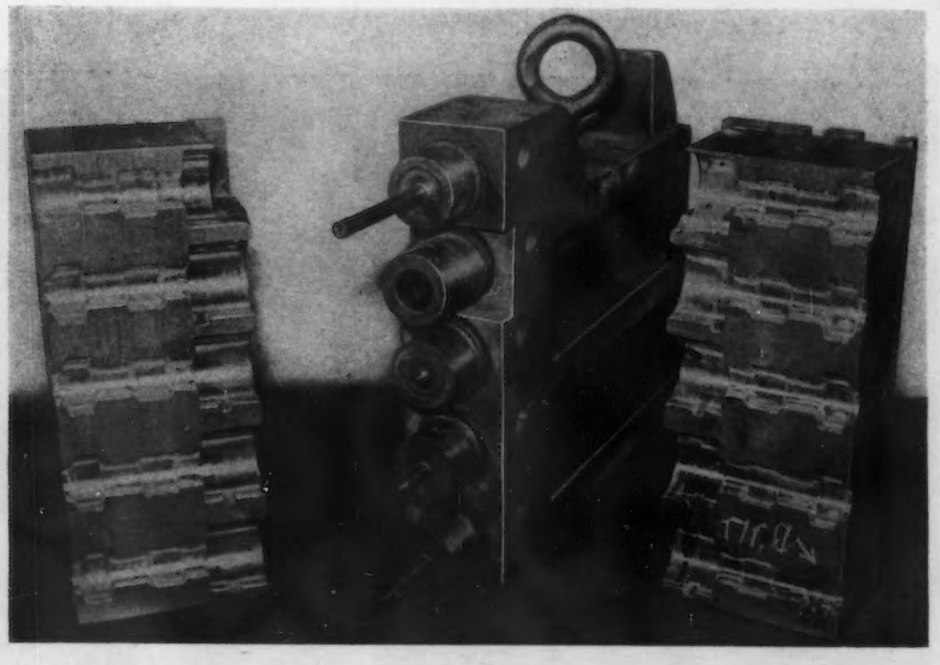
An ingenious method is utilized to transfer hot billets from the furnace to the first of two 12,000-lb. Chambersburg steam drop hammers. A so-called porter bar grabs the billet. This bar is at one end of a device which is swung around to the hammer by an operator, who manipulates it at the other end. What otherwise might be a cumbersome, awkward task is thus simplified.

Billets are rolled and blocked in the first drop hammer, which has two dies. The material then is transferred to the second hammer, where it is finished in 10 to 15 blows. A workman is stationed at the second hammer to flood the hot metal with steam to remove whatever scale accumulates during the forging operation. This is done by means of a portable hose which can be used at any vantage point desired.

Facing the necessity for a continuous flow of crankshafts through its forge shop, not subject to interruptions which would tie up not only the forge division but also other departments, Buick selected hammers which by reason of structural, mechanical and metallurgical excellence are as dependable as any machine tool can be. Each hammer weighs over 400,000 lb., exclusive of dies. The anvils are in two sections, the lower section being made of Cecolloy, a high-strength molybdenum iron, and the upper section of annealed cast steel. The base is extremely wide to prevent rocking and to minimize the possibility of destroying the timber cushion which tops the concrete foundation. From the base the entire hammer structure tapers in almost unbroken lines to form a massive A frame, which takes the punishment from the terrific impact of the ram.

Each frame of the hammer is an annealed steel casting weighing 28,500 lb., the bearing areas and sections being much heavier than those in hammers formerly regarded as standard. To combat any tendency to rock or twist, the frame, which is a modified I-beam section, is stepped, tongued, grooved and overlipped at the frame-to-anvil connection. All thrust surfaces can be renewed without dismantling any part of the hammer. The top of the frame is spaced by a stepped tie plate of forged and heat-treated steel 10 in. thick, fitted with packed alloy steel shims which cushion the shock of the blows without permitting perceptible movement.

The cylinder is of new design, equipped with a patented slide valve, which is self-balancing and carries steam pressure on the inside instead of the outside valve. The cylinder bores have been reduced from 27 in. to 23 in. in diameter, the speed and effectiveness of the hammer being increased at the same time. The cylinder itself is a steel casting, with a liner of special low-carbon, air-furnace iron alloyed with 1.50 per cent of



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DIES with heading tools used in deep piercing hole in countershaft gears. Deep piercing produces refinement in quality and lowered costs.

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HOT billets are transferred from heating furnace to first of two steam drop hammers by means of a porter bar manipulated by an operator.

nickel and 0.50 per cent of molybdenum, to insure long wear against the abrading effect of the piston.

Provision is made for maintaining initial valve clearance and this, together with the reduced bore and long wearng liner, has reduced steam consumption. The cylinder is held in permanent alinement by a stepped and counterbored joint between it and the tie plate. The forged ram is made of S.A.E. No. 4140 steel, heat treated after being rough machined. The piston rod, 8 in. in diameter, is built of special heat-treated chrome nickel molybdenum steel. The high-carbon steel piston is attached to the rod by a shrink fit and riveted connection. Piston rings are of cold-drawn steel, which is work hardened by being processed to shape. The anvil cap is a high alloy steel forging.

Mechanism for operating the hammer is simple. The actuating cam and arm are a one-piece forging. The connection to the main valve stem is direct, without any transfer or reversal of motion by rocker arms. The control, therefore, is as easy and accurate as in hammers of much smaller capacity.

Safety of the machine is assured by the fact that the operator can make the hammer inoperative with a single motion of his hand. Each cylinder is fitted with a safety cover with a tough alloy iron lid which provides a cushion of live steam to make harmless the impact of a broken or detached piston rod.

All oscillating joints are bushed with long-wearing ferrous bronze. Bolts and springs are of heat-treated alloy steel. The main frame-to-anvil bolts are 4½ in. in diameter.

From the second steam drop hammer the forged crankshaft is transferred to a special fixture adjoining the hammer, where the counterweight edges are cooled in water to avoid distortion in trimming the flash. It then passes through an air-clutch-operated Toledo press, where the flash is trimmed. The crankshaft goes to an upsetting machine to have the flywheel flange upset and thence to a twisting machine designed by Buick engineers and built by the Ajax Mfg. Co., Cleveland. In this machine the crankshaft is twisted to a 90-deg. angle. This operation is necessary because the crankshaft cannot be forged to shape, since the counterweights are forged integral with the shaft.

Crankshafts are heat treated in a continuous pusher-type high-temperature furnace 40 ft. long and fired with oil by six burners. The temperature of the crankshafts is raised from the cold state to 1550 deg. F., at which it is held for 1 hr. Passage through the furnace takes 2 hr. At the loading end of the furnace, an operator lifts the stock from a large tote box onto special fixtures by means of a hand hoist. These fixtures, made of heat-resistant alloy steel, rest on two alloy steel rails running through the furnace, the crankshafts being placed on them crosswise. At the discharge end of the furnace the operator removes these fixtures by hand and puts them on a gravity chute alongside the furnace which takes them back to the loading end.

Hot crankshafts, as they come from the heat-treating furnace, go through a 600-ton Chambersburg hydraulic setting press to align the pins and bearings and straighten the cheeks. This press is of the four-column, moving-down, platen type, operating at a fluid pressure of 5000 lb. per sq. in. The entire machine is above the floor line, the overall height being 14 ft. and total weight 48,000 lb. The cap, base and moving platen are of Cecolloy. The cylinder is a heat-treated steel forging inserted in the alloy cap.

Columns are heat-treated steel forgings, turned and polished, seated in replaceable cast iron

(CONTINUED ON PAGE 90)

S.A.E. 5150 (C 0.51, Mn 0.66, Cr 1.00)

S.A.E. 52100 (C 1.02, Mn 0.50, Cr 1.35)

S.A.E. 3115 (C 0.17, Mn 0.53, Cr 0.68, Ni 1.21)

S.A.E. 3335 (C 0.37, Mn 0.55, Ni 3.40, Cr 1.37)

S.A.E. 4615 (C 0.16, Mn 0.41, Ni 1.81, Mo 0.23)

SPARK T

Characteristics of Im

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THE initial portion of this review of spark testing, which was presented last week, showed that a study of spark-stream characteristics can be of considerable value in economically and rapidly classifying steels and also can be employed in preventing various grades of steels from becoming mixed.

The pictures presented last week described the spark characteristics of the carbon-manganese types of S.A.E. steels and also carbon-manganese-nickel steels. It was shown that low-carbon 0.60 to 0.90 per cent chromium steels (S.A.E. 5120 type) have a spark-stream containing sprigs of low-carbon steel with brilliant chromium stars. As the carbon increases the flame color gradually darkens and the star-bursts become more numerous until at 0.50 per cent carbon (S.A.E. 5150 containing 0.80 per cent to

S.A.E. 3130 (C 0.31, Mn 0.71, Ni 1.18, Cr 0.72)

S.A.E. 3140 (C 0.39, Mn 0.63, Ni 1.19, Cr 0.66)

S.A.E. 3240 (C 0.41, Mn 0.50, Ni 1.92, Cr 1.00)

TESTING

portant S. A. E. Steels

1.10 per cent chromium) the flame is dark. S.A.E. 52100 containing 0.95 per cent to 1.10 per cent carbon and 1.20 per cent to 1.50 per cent chromium has a spark-stream which consists of short carrier-lines, dark orange in color with a myriad of brilliant, flower-like star-bursts throughout.

In the low-carbon S.A.E. 3115 type steels which contain 1.00 per cent to 1.50 per cent nickel and 0.45 per cent to 0.75 per cent chromium the flame is light orange and the carbon sprigs at the end of the carrier-lines appear to bend. The higher carbon S.A.E. 3130 reveals the same effect except for a darker orange shade with very short sprigs at the end of the carrier-lines. Star-bursts appear as the carbon increases and at the same time the larger stars designating chromium are also visible. S.A.E. 3140 shows the same effect with the exception that the higher car-

S.A.E. 4640 (C 0.38, Mn 0.59, Ni 1.80, Mo 0.28)

S.A.E. 4130 (C 0.32, Mn 0.69, Cr 0.75, Mo. 0.22)

S.A.E. 6120 (C 0.19, Mn 0.59, Cr 0.91, V 0.17)

bon produces more star-bursts. S.A.E. 3240, the 0.40 per cent carbon, 1.50 per cent to 2.00 per cent nickel, 0.90 per cent to 1.25 per cent chromium grade is similar to S.A.E. 3140 except the stream is darker and the nickel and chromium characteristics are more in evidence. S.A.E. 3335, containing 3.50 per cent nickel and 1.50 per cent chromium with about 0.35 per cent carbon has a dull orange spark-stream with bright nickel blocks, and chromium stars appearing at the end of the carrier-lines.

Molybdenum displays a spark shaped like a well defined spear-point at the end of, and detached from, the carrier-line. This characteristic enables positive identification of molybdenum. In the chrome-molybdenum steels of the S.A.E. 4130 type, containing 0.50 per cent to 0.80 per cent chromium and 0.15 per cent to 0.25 per cent molybdenum, the detached spear-point is very apparent and stars at the end of the carrier-line indicate the presence of chromium. A peculiar feature of these grades is that the lower carbons have much fewer star-bursts than other steels of the same carbon ranges.

Vanadium steel has a spear-point spark similar to that of molybdenum steel except that it is attached to the extreme end of the carrier-line. In low-carbon chrome-vanadium steels of the S.A.E. 6120 type, containing 0.80 per cent to 1.10 per cent chromium and about 0.18 per cent vanadium the flame is a dark orange, more "fluttery" than the straight chromium type and with chromium stars at the end of the carrier-line and the spear-point attached, even beyond the carbon sprig. The higher carbon chrome-vanadium steels of the S.A.E. 6140 type reveal no marked difference, except that a carbon star-burst appears instead of a sprig.

A tungsten grade of steel (S.A.E. 7260 containing 0.50 per cent to 0.70 per cent carbon, 0.50 per cent to 1.00 per cent chromium and 1.50 per cent to 2.00 per cent tungsten) is red in color with short and sparse carrier-lines, at the top of which are larger attachments, illuminated, and tending to droop over. Tiny star-bursts occur infrequently at the base of these attachments, exploding downward into symmetrical shaped divisions.

Silicon-manganese steel usually contains about 2.00 per cent silicon, 0.60 per cent to 0.90 per cent manganese and 0.45 per cent to 0.65 per cent carbon. Its flame is dark red and the star-bursts cling to the sides of the carrier-lines, shaping themselves like short spurs, in the center of which are dots or fire.

S.A.E. 7260 (C 0.55, Mn 0.28, Cr 0.95, W 1.97)

S.A.E. 6120 (C 0.19, Mn 0.59, Cr 0.91, V 0.17)

S.A.E. 9260 (C 0.57, Mn 0.81, Si 1.92)

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Simplicity Is Achieved in Steel Garden Chair

USE of steel in the manufacture of furniture is being broadened by the development of new models. These are not only highly attractive in appearance, but in some cases are designed to reduce the cost of production, thereby bringing down the retail price and tending to increase the popularity and sale of the product.

The tendency in the direction of lower production costs and a more extended market through a lower price to the consumer is illustrated in an all-steel spring-type porch and garden chair shown in the photograph. This chair is a new model brought out this season by L. J. Zerbee & Co., Bellefontaine, Ohio, who operate a forge shop and foundry for the manufacture of steel and hand-wrought furniture and other products in ornamental metals.

Of unusual simplicity in design and construction, the chair is an assembly of only five members, not counting 12 bolts and nuts that join the members. Fabrication of the chair is simplified by a design that is quite a departure from many of the more recent models of steel chairs and has made possible a sharp cut in production costs.

Instead of having a tubular frame between which cross-members are welded or bolted, the entire seat and back assembly is made of a single piece of sheet steel. Operations in forming this seat and back include the forming of a semi-tube around three edges of the sheet, perforating rectangular holes in the back and seat, bending the piece to form the back, seat, and a strip at the front of the seat, to which the one piece that forms the leg and arm is bolted.

This design eliminates many welds, holes and rivets. A strip of automobile spring steel is bent to shape to form the leg and arm. At the top end of the arm a short piece of steel is welded for holding the arm to the back. This is the only welding required. The other parts are two cross-members that are bolted to the legs.

Die costs are low, for with the chairs all made in one pattern a duplication of dies is avoided. While there is no variation in design, a wide variety for selection is obtained by finishing in color combinations. The perforated seat and back are stenciled, giving them the appearance of being woven. Finishing is in baked enamel in one color or two harmonizing colors, one for the perforated part of the back and seat and the other for the remainder of the chair. The chairs are made with chromium-plated arms and legs, in addition to the various color combinations in enamel.

The Allegheny Steel Co., Brackenridge, Pa., has received an order for about 8000 lb. of cold-rolled stainless strip steel, aggregating 21,000 linear feet, to be used in the construction of a streamline train in Italy. The order was placed by Piaggie & Co., Genova, who last January placed the largest single export order for stainless steel in several years and built a three-car streamline train of the Burlington "Zephyr"-type under the supervision of engineers of the Edward G. Budd Mfg. Co., Philadelphia.

▲ ▲ ▲ New Classifier Minimizes Gage

USERS of tin plate and light gage sheets are constantly demanding material of more uniform gage. This is especially so in sheets that are to be used for deep drawing purposes and tin plate in products such as bottle caps and friction top cans where variations in gage cause considerable trouble. Consumers have also found that by using sheets with only slight variations from standard gage, the life of their forming dies is prolonged, delays in production are reduced, and a more uniform product is obtained.

In the production of light gage cold-rolled strip from which sheets and tin plate are produced, there occur certain inherent variations in gage of the material throughout the length of the strip. These variations may be caused by deflections in the mill stands, change of contour of the rolls, hard and soft spots in the material, variations in tension, etc., and this is true with strip produced both by tandem and reversing mill methods.

Of great interest, therefore, is a new classifier put into successful operation and patented by the Jones & Laughlin Steel Corpn., Pittsburgh. This unit will separ-

o o o

BELOW

SHEETS within 0.0005-in. of standard gage thickness proceed to the end of the classifier table. Off gage sheets automatically drop through gates in piles on hand trucks. Into one pile go the thin sheets and into the other the thick sheets. Mounted on one of the stagger piler uprights, at the extreme left, is shown the micro-ammeter which reveals the gage of the sheet being measured by the flying micrometer.

FINISHING end of a continuous cold strip mill as equipped unit is shown at the right while toward the left are the

Variations In Flat-Rolled Steel ▲ ▲ ▲

with the new gage classifier. Flattening and side trimming crop shear, flying shear, classifier table and stagger piler.

o o o

BELOW

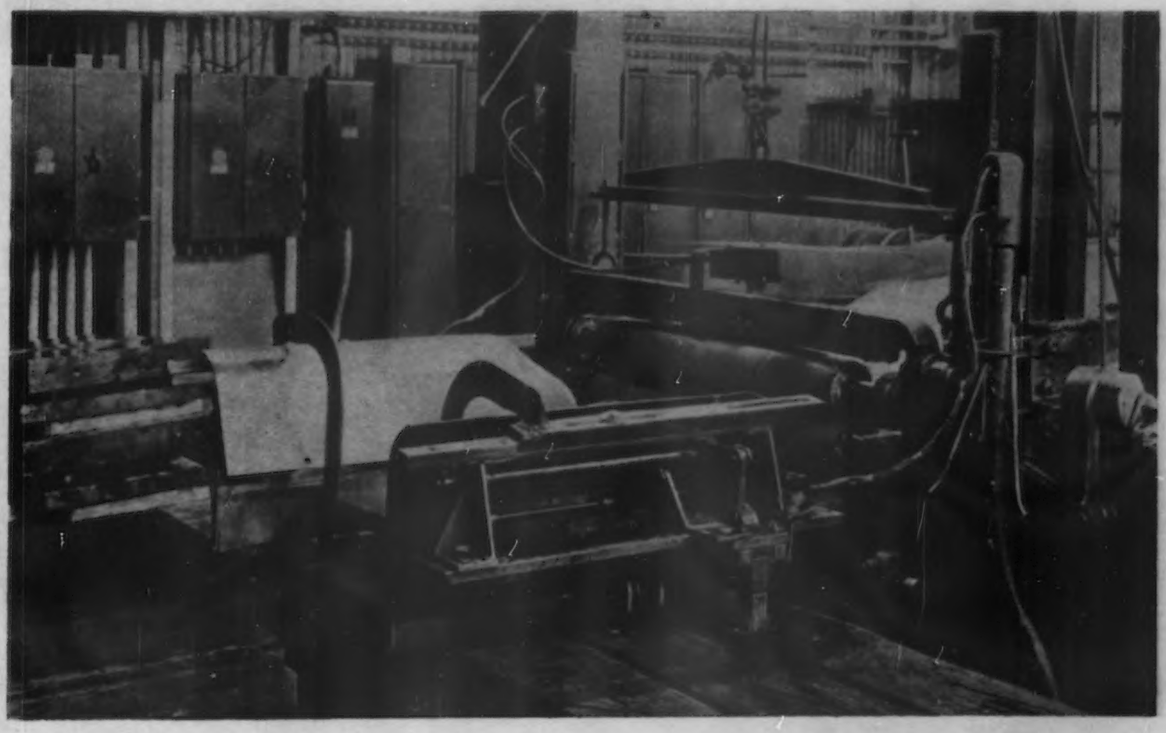
SHEETS within acceptable gage limits are piled in a stagger piler so as to make it easy to separate them. They are staggered in one direction, from right to left, being piled against a stop in the forward direction. The staggering may be by individual sheets or by packs containing any desired number of sheets. As shown in the illustration, the guide at the left is tilted so as to pile the sheets against the right guide. In the background are shown the control panels for this installation.

ate sheets produced from cold-rolled strip into several different classifications and can hold the tolerance from standard gage within exceedingly small limits. For instance, for a given gage, the classification could be those sheets falling within the specified tolerance from standard gage; another classification could be the sheets slightly below this tolerance; the third classification could be sheets even lighter than the above; the fourth classification could be sheets just slightly heavier than those specified as standard, and the fifth classification could be those that are heavier than classified in the fourth classification. Of course, this dividing of sheets could be carried out in any desired manner of classification.

To Be Built by Aetna-Standard

This new classifier, to be manufactured and sold by the Aetna-Standard Engineering Co., Youngstown, under an exclusive license, can be used at a speed of approximately 400 ft. per min. on practically all classes of sheets produced from continuous strip.

In a typical installation shown in one of the accompanying illus-



trations, the strip in lengths of several hundred feet is delivered to the classifying unit on drums from a reversing cold mill. The drums are mounted in a coil box and the strip fed through a machine equipped with flattening rolls and which also trims the strip to width. The trim from both edges comes out in ribbons which are cut by a rotary shear into suitable lengths and dropped into boxes for further disposal. The strip then passes through a crop shear, which squares the front end, and then to the pinch rolls and flying shear.

The gage measuring device is a so-called flying micrometer or electrolimit gage mounted ahead of the pinch rolls feeding the flying shear and is set for various gages to carefully made standard test pieces.

Before the sheet is cut to predetermined length by the flying shear, the flying micrometer has determined the variation in gage and into which particular classification the sheet is to be piled by the classifier table.

Classifying Table of Multiple-Belt Type

A classifying table of the usual multiple belt type is used and is equipped with solenoid operated gates for diverting the off gage sheets. It will separate the sheets into three classifications, the heavy going into one pile under the table, the light into a second pile and the correct sheets going into a stagger piler at the end of the table.

The flying micrometer is provided with two small rolls between which the strip passes continuously on its way to the flying shear. One of these rolls is fixed, whereas the other will move according to the variation from gage of the strip, and by means of opposed induction coils and an armature which is suitably attached to the movable roll, a slight variation in voltage in the coils is produced and indicated on a micro-ammeter. Attached to the indicating pointer on the micro-ammeter are suitable contactors that make contact with adjustable mercury contactors mounted on the micro-ammeter, through which this slight variation in voltage is transmitted to thyratron tubes mounted on the control panel, and through suitable time delay relays operate the solenoids on the classifying table. These solenoids in turn operate the gates through which the classified sheet is thrown into the correct pile.

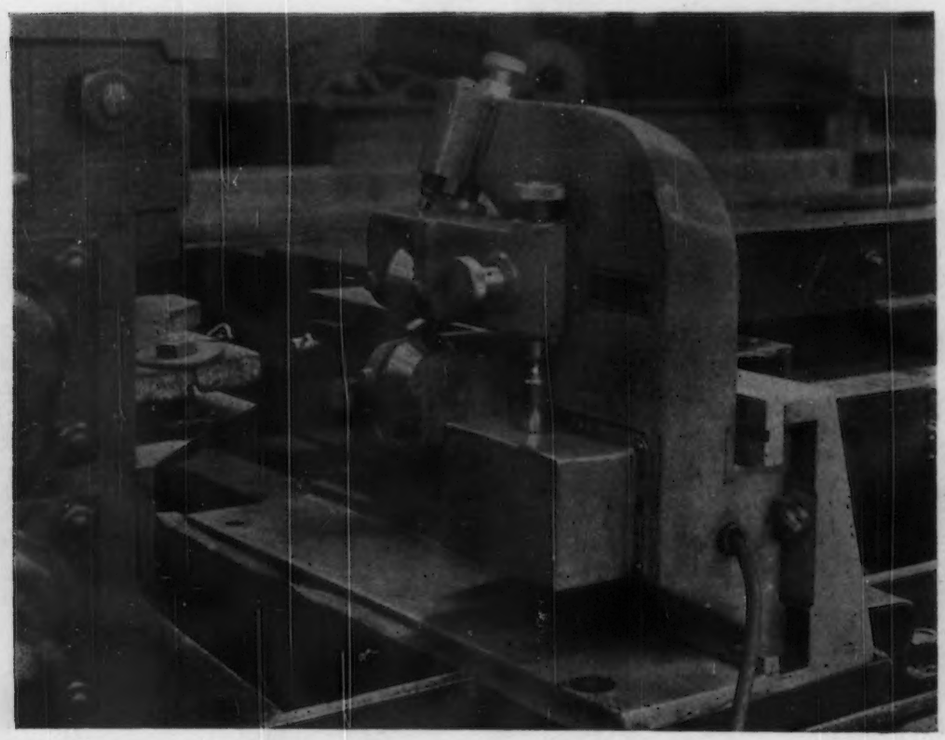
It will thus be seen that as long as the movement of the roll is confined within narrow limits, the variation in gage is very slight, but after passing a certain limit predetermined by the position of the mercury contactors on the micro-ammeter, sheets will either be thrown into the light or heavy pile.

The stagger piler shown in another illustration, will pile any predetermined number of sheets alternately from one side of the pile to the other side of the pile, and makes the sheets easily separated for charging into the normalizing furnace or for other purposes. The staggering is accomplished by guides at the right and left hand side of the piler. By tilting the left hand guide and leaving the right hand guide vertical, the sheets would be thrown to the right hand side and vice versa. This tilting of the guides is accomplished by a photo-electric cell, or magnetic eye, which is connected to a counting and recording device. This device reveals the total number of sheets passing into the piler. When a predetermined number have passed into the piler, the counting device reverses the position of the guides, thereby forming a stagger pile.

The gaging of the strip is done near one edge, as it has been found in practice that the variation in gage across the width of the strip is negligible. It can, therefore, safely be said that the gage found along the edge represents the thickness across the width of the sheet, this being especially true of strip produced on modern four-high cold rolling mills. In practice the variation from standard gage of plus or minus .0005 in. is acceptable by the trade.

In order to have five classifications instead of three, it is only necessary to add an additional micro-ammeter, thyratron tube and relays and two additional gates on the classifying table.

From the standpoint of the tin plate maker, considerable advantage is gained in holding as nearly as possible to standard gage which, of course, produces a more uniform weight and eliminates the loss caused by over weight besides enabling him to better satisfy the demands of his customers.



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THE new gage measuring device is a flying micrometer or electrolimit gage mounted on the entering table of the flying shear. It consists of two rolls; the bottom roll is fixed while the top roll moves up and down with gage variations, thus making electrical contacts which determine into what pile the sheet will go after shearing.

Huge Steel Castings Support Golden Gate Bridge Cables

A VIVID indication of the magnitude of the Golden Gate bridge, San Francisco, is provided by the size of the steel castings shown here, which are employed to support the cables on the tops of its towers.

Each cable support or saddle consists of three segments bolted together, weighing approximately 150 tons. The maximum metal thickness is 7 in. Their inner grooved surfaces are designed to provide smooth curved supports for the cables.

Mounted on the tops of the towers, the saddles rest on nests of rollers, and in their original position are set shoreward, 3 to 5 ft. from their final position. As the construction of the suspended portion of bridge structure proceeds, the cables tend to decrease in sag and elongate slightly, with the result that the saddles gradually move bayward as the weight increases, until they are in final position centered on the towers when the section is completed. In this position the rolls will be killed and

ABOVE

CAST STEEL segment of a cable saddle for the Golden Gate bridge as it appeared from its mold in Bethlehem's foundry.

o o o

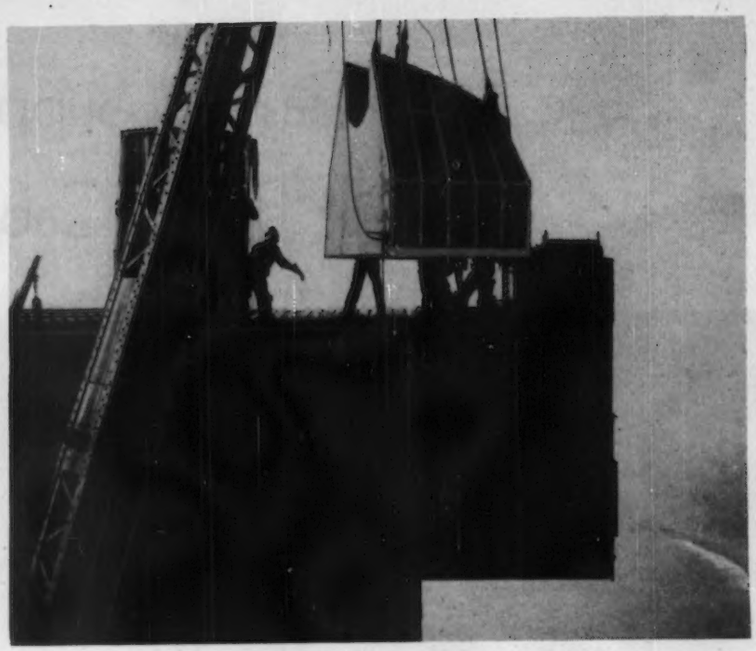
AT RIGHT

MILLING grooves for the Golden Gate bridge cables in a gang of saddle castings at Midvale.

the saddles fixed or anchored permanently to the tower tops.

These huge castings originated in the steel foundry at the Bethlehem, Pa., plant of the Bethlehem Steel Co., where the casting and rough machining operations were performed. They were finish-machined by the Midvale Co., Nicetown, Philadelphia.

Two open-hearth furnaces were required to provide sufficient steel for these huge castings. The plain carbon steel was teemed from them simultaneously into large ladles, from which it was poured into pit molds that had been arranged for bottom pouring, with nine risers per segment. The accompanying illustration shows a cool segment as it appeared from its mold after it had been cleaned. Following the removal of the risers, the segments were annealed to remove internal stresses, and rough-machined at Bethlehem before being shipped to Midvale for finish-machining.



SEGMENT of a cable saddle reaching the summit to crown Golden Gate bridge tower, 746 ft. above mean high water.

Business Editors Find Government Loans to Industry Inadequate

MACHINERY created by Government to finance business, particularly small business, has not functioned altogether satisfactorily, according to a study entitled, "What About Direct Loans to Industry?" just released by a committee representing the 130 member publications of the Associated Business Papers, Inc., and the National Conference of Business Paper Editors. This study, which analyzes the record of Reconstruction Finance Corpn., of Federal Reserve Banks and the Federal Housing Administration, points out that to date only a fraction of the funds intended for use by business has been released. The further point is made that railroads, insurance companies, banks and farmers have realized far greater benefits through Federal financing than has private business.

Of approximately $580,000,000 authorized for the specific purpose of bolstering credit for industry, only about $155,000,000 of loans have been approved one year after RFC and Federal Reserve Banks have been impowered to make direct loans. Reasons for this situation are analyzed and the factors that have caused business men to hesitate in applying for loans as well as the factors that have caused RFC and Federal Reserve officials to hesitate in granting loans, are enumerated.

The study shows that hesitancy to apply for loans traces to fear of red tape; reluctance to borrow; lack of knowledge; fear of possible Government interference in management; animosity toward Government measures to finance business and hesitancy to expand operations in the face of an uncertain future. Factors held important in turning down loans include insufficient security; unsound competitive situations; questionable management; unwillingness of management to reduce excessive disbursement of funds; poor accounting methods and lack of proper presentation to the loaning agencies.

Many constructive recommendations are made pointing the way to correct this situation. These include a plea for better education both of the banking fraternity and of business men as to the availability of funds, and the means by which they may be obtained; a plea for faster action in handing applications; a recommendation that a larger proportion of loans granted be allowed for use in payment of back debts; a suggestion that the loan agencies might well assume a part of the cost involved in putting loan applications in shape for action; an urgent request that small business should receive relatively greater consideration than it has to date; a recommendation that RFC should exercise its permissive function of financing inventions and new business and that, in general, direct loans should be regarded as a primary means for natural creation of employment as a stimulus to recovery.

This study, available at 50c. per copy through The Associated Business Papers, Inc., 330 West Forty-second Street, New York, is to be followed shortly by another, prepared particularly for business men who are interested in possibility for obtaining loans either through Federal Reserve System banks, Reconstruction Finance Corpn. or Federal Housing Administration.

Crucible Steel Co. of America is opening a new branch distributing warehouse in recently remodeled building at 308-12 West Maryland Street, Indianapolis, providing about 14,000 sq. ft. of floor space, or more than double of floor area in local building at 437 South Illinois Street, heretofore occupied.

Direct-Fired Unit Heater

A DIRECT-FIRED unit heater, constructed of steel and electrically welded throughout, has been developed by the Dravo-Doyle Co., Pittsburgh. The lower portion of the combustion chamber of the heater is lined with high-grade insulating brick. The sides and top of the combustion chamber are made of corrugated steel, with welded fin deflectors on the outer surface. An outer shell of copper-bearing steel completely surrounds the sides and top, leaving an air chamber of the proper proportion.

The Dravo heater is designed for firing with oil, gas, coal, coke or coke braize, and can be either manually or automatically controlled. Pushbutton starting and thermostatic control is used with oil or gas burners, or automatic stokers. The unit can be equipped with safety devices, such as a furnace switch in the air discharge to shut off the fuel in the case of overheating the air, a stack switch in the exhaust to shut down in case of flame failure, and a fuel shut-off to function in case of power failure. Overheating of the metal in case of shut-down is prevented by making the refractories of the insulating type, which are light in weight and consequently do not store an appreciable quantity of heat.

In the space between the outer casing and the corrugated shell of the combustion chamber is a rapidly and uniformly moving body of air. In the 750,000 B.t.u. size, 10,000 cu. ft. of air per min. from two blowers located in the base of the unit is passed at 0.8 in. pressure over this heating surface. The air emerges at the base of the unit in three horizontal streams, the one in the center at right angles to the face of the unit, the ones at each end at 45 deg. from the face. This gives a uniform distribution of hot air along the floor. Cold air is taken in from opposite side and also along the floor. In cases where the hot air discharge at floor level is objectionable, the fans are located on top of the combustion chamber and the hot air flows parallel with the floor about 8 ft. above it. With 60 deg. F. inlet air temperature, the normal air discharge temperature will be from 130 deg. to 140 deg. F. The combustion chamber being completely surrounded with "black surface," the transmission of heat by radiation is high. Welded fins further increase the heating surface, and deflectors direct air from the outer casing toward the inner hot surface and give sufficient turbulence so that the heat transfer by convection is also high.

Gases from the combustion chamber are removed with a small exhauster, which is connected to the same shaft and driven by the same motor as the blowers which handle the air. This means that while the unit is in operation, the combustion chamber is always under a slight negative pressure.

The accompanying illustration of a Dravo direct-fired unit heater indicates the path of the air (black arrows) through the fans and over the corrugated heating surface. The heated air is discharged on the opposite side at floor level. The white arrows show the gas or oil mixture leaving the burner, also the flue gases being removed through the exhauster at the left-hand end. The driving motor is located between the fans, as shown, or at the end of the unit.

Strip Steel Turntable

A NEW Westinghouse-equipped electrically operated 7-ft. diameter turntable, suitable for revolving 6-ton coils of strip steel prior to pickling, has been announced by Mathews Conveyer Co., Ellwood City, Pa. The unit, which is driven by a 5-hp., 1200-r.p.m., three-phase, 60-cycle, 220-volt motor coupled to a vertical speed reducer and spur gears, is purported to receive from a straight line of conveyers 12,000-lb. coils of strip steel, placed on the conveyer from coil storage at random. The turntable serves to place the coils of steel with their fishtails in proper position to enter the continuous pickler. Since the coils are conveyed on either side, core axis horizontal, a troughed section of heavy-duty conveyer is used to handle the circular shape. Individual rollers in the conveyer section are ball-bearing grease-packed type fitted with grease fittings for periodical lubrication. The rollers are 3⅝ in. in diameter, each with a continuous load rating of 2000 lb.

Improvements in Production

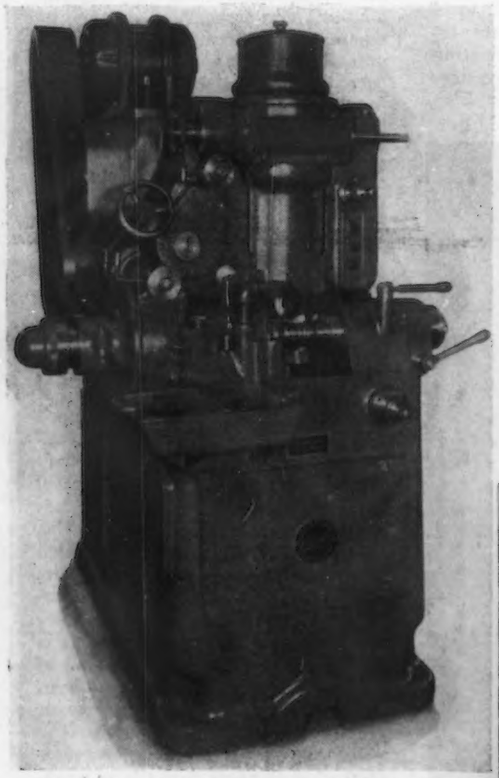
Hourglass Gear Shaper and Worm Lapper

NEW machines announced for the first time by the Fellows Gear Shaper Co., Springfield, Vt., at the recent Machine Tool Show included a new gear shaper for cutting hourglass worms for steering gears and reduction drives, and a machine for lapping straight worms after hardening or grinding. Both machines and close-ups of the tools and work are illustrated herewith.

The hourglass gear shaper, designated as the No. 6, is designed to produce at a high rate worms of high accuracy and smoothness of finish. The cutter rotates in mesh with the work, and reciprocates at the same time that it is feeding to the required depth. The work makes one complete revolution after the cutter has reached full depth. The cutter is fed into depth by a feed cam, which advances the cutter toward the work at a definite rate. This cam is provided with a "dwell" for the finish cut. The same cutter is used for roughing and finishing. It is withdrawn from the work on the return stroke by a quiet-operating relieving mechanism.

The saddle carrying the cutter-spindle is mounted on trunnions, permitting the saddle to be "rocked" back and forth for the cutting and return strokes of the cutter. Provision is made through change gears for cutting different numbers of teeth or threads, and for different depth and rotary feeds. There is also a feed reversing device for changing direction of rotation of the cutter-spindle for cutting worms having right or left-hand threads.

This machine is particularly adapted to motor drive and electrical control. It is easy to set up



AT LEFT

HOURGLASS gear shaper designed for high production of steering gears and reduction drives with high accuracy and smoothness of finish.

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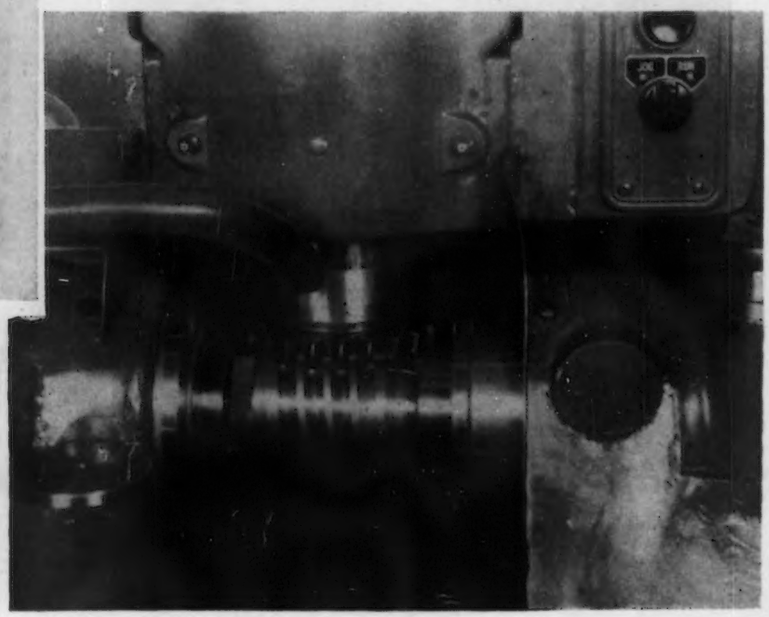
BELOW

CLOSE-UP view of hourglass worm and gear shaper cutter. The cutter rotates in mesh with the work and reciprocates at the same time that it is feeding to depth.



and Shop Equipment . . .

Announced at Machine Tool Show

and operate. Capacity is governed to a large extent by the diameter of the gear that mates with the worm, the cutter having the approximate diameter of the mating gear.

Worm Lapping Machine

The worm lapping machine employs a throated cast-iron worm wheel as a lap. The work is held on an arbor mounted between a driving and live center. The live, or tailstock center, is mounted on ball bearings sealed to prevent the entrance of lapping compound.

The table carrying the work is reciprocated by a crank mechanism operated by a 1/3-hp. motor and reduction gear unit. Table travel is adjustable for stroke length. The headstock center is driven positively by a ½-hp. motor through change gears. The worm-wheel type lap is rotated by the work, and an adjustable brake on the lap-spindle furnishes the necessary resistance to expedite the lapping action. The machine is provided with definite time relays connected with the "headstock" motor to control the number of revolutions of the work in either direction for lapping both sides of the thread.

This machine can be successfully employed for lapping worms after hardening, or after grinding. When it is used for lapping worms after hardening, the lap is made from a fine-grain cast iron, and a fairly coarse abrasive is used. When the machine is employed for lapping ground worms, the laps are made from pressed cork, and a fairly fine-grain abrasive is recommended. A very high polish can be obtained on the worm by this method.

Lapping compound is mixed with a non-fluid oil, which keeps the abrasive in suspension. The compound is pumped directly to the lap and work by a ¼-hp. motor-driven pump having an agitator which keeps the compound thoroughly mixed. Maximum capacity is 4 in. pitch diameter and 5 in. thread length.

AT RIGHT

NEW machine for lapping straight worms after hardening or after grinding. A throated cast-iron worm wheel is employed as a lap.

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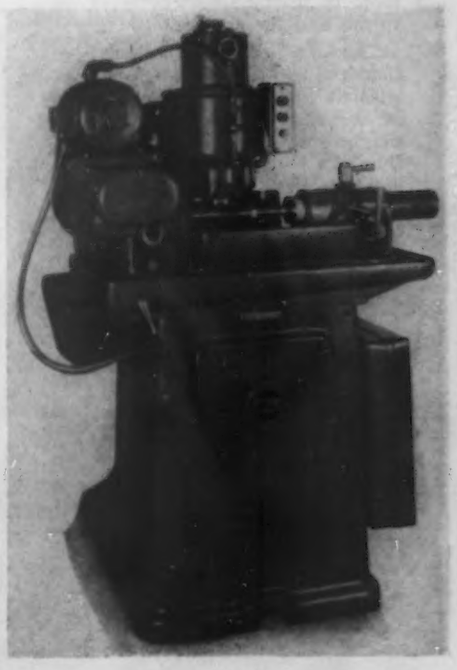
BELOW

CLOSE-UP view of straight worm and worm-wheel type lap. The work table is reciprocated by a crank mechanism and travel of the table is adjustable for stroke length.



Improvements in Maximiller Design

SIDNEY MACHINE TOOL CO., Sidney, Ohio, stresses in the design of its Maximiller line, formerly built by Kempsmith Co., Milwaukee, simple, sound and rigid construction with maximum flexibility and operating convenience. The Maximiller machines are built in Nos. 2, 3, 4 and 5, in both plain and universal types.

Speed and feed transmissions are mounted on 32 radial and combination radial and thrust-type ball bearings. The spindle is mounted on a double row of New Departure ball or Timken precision taper roller bearings, which absorb the radial and thrust loads under heavy cuts and fast feeds. Speed and feed changes are made through sliding spur-tooth gears. All gears are driven through 10-spline shafts. The spindle gear is rigidly keyed on the spindle. All gears are wide faced and are mounted close to bearings for the reduction of deflection. Heat-treated alloy forged steel is used. Lubrication is by splash and force feed.

The knee is of box-type construction, and slides up and down freely without play through employment of a solid, one-piece angular tongued gib. The design is such that the bolts which seat the gib and the knee together are pulled up solid, with no chance of drawing up the bolts, so that the top knee is held solidly, leaving the bottom free from bearing. This construction eliminates "feel" in tightening and is said to permit power feed up-and-down movements on production without fear of machine abuse.

The column is built to absorb torsional and bending strain through well-ribbed box section frame construction and heavy bearing bosses.

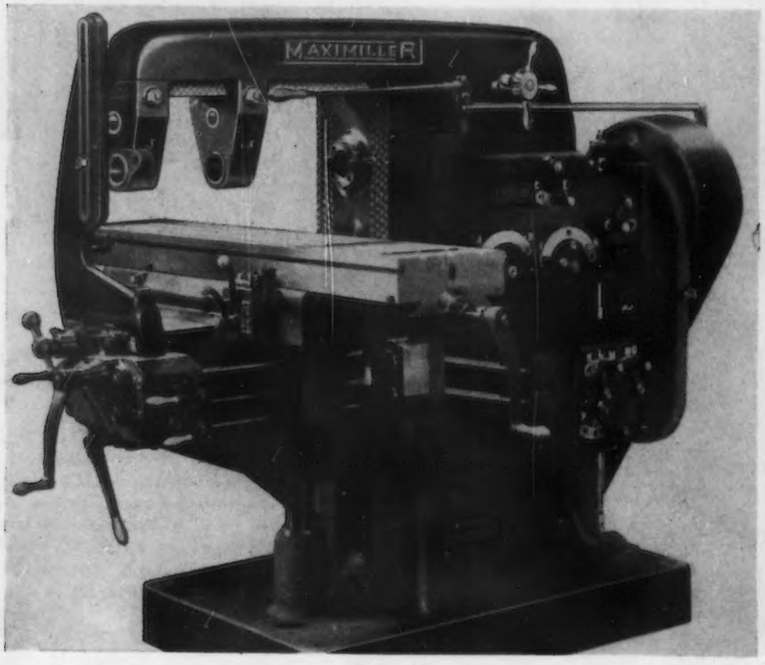
The vee-ways on the under side of the rectangular overarm are clamped against the solid side of the column, at two points conveniently located on the column, for strain resistance. Star-wheel operation is provided for in-and-out movement of the overarm.

Operating convenience is indicated by the single work position taken by the operator. Power quick traverse is available in all directions with the cutters stationary or revolving. Controls are provided with interlocking safety mechanism.

The saddle is built to furnish generous bearing surface for the table. In addition to the support for the table the sliding action between the knee and the saddle is readily accomplished without sacrificing stiffness. The table bearing surface is practically as long as the table travel and is provided with a clamp for locking to the knee. All bearings and mechanism are oiled from one centralized station.

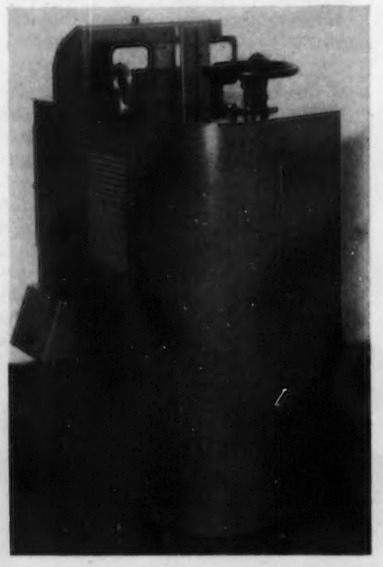
A large, rugged table is of fine grain semi-steel, machined all over and having a generous depth of metal around each tee slot. Troughs on the sides and ends are supplemented by a flexible tube providing positive means for returning all cutting compound to the reservoir.

All Maximillers are especially built with the columns arranged for motor in base drive through either silent chain or V-belt. Motor ventilation is by fan at rear, providing circulation through two openings on the side of the column.



Welder of A.C. Type For Production Work

ONE of two new a.c. welding machines to be demonstrated by the Westinghouse Electric & Mfg. Co., East Pittsburgh, at the National Metal Exposition at Chicago, is illustrated herewith. It is a 500-amp. transformer-type unit with a welding range from 100 to 500 amp. and is designed to operate at high efficiency. The machine is equipped with automatic control that cuts the machine off the line when the operator stops work, and is brought back on the line by a momentary contact made by a switch in the holder. This transformer-type single-operator welder is said to meet the need for relatively high current values for speedy production work.



A new 30-150-amp. a.c. welder will also be shown. This welder, which is completely inclosed, is of the transformer type with high efficiency and is available for primary voltages of 110-220 or 220-440. It weighs 230 lb. and is designed for production work as well as for use in repair shops.

The company will also exhibit a 300-amp. Flexarc d.c. welder with a.c. or d.c. drive, together with a

display of phos-copper welding alloys with especial applications to refrigerator condensers, cooling coils, evaporators and piping; plumbing, radiators, water piping; water heaters; copper boilers; electrical bus bars, terminal connectors and damper windings.

Upright Drills Incorporate New Features

CINCINNATI BICKFORD TOOL Co. has introduced a line of 21, 24 and 28-in. superservice upright drills which involves marked improvements. The illustrations show the design of both round and box-column types. The 24 and 28-in. sizes provide 12 speeds in ranges from 60 to 1000 r.p.m. or 90 to 1500 r.p.m. and nine rates of power feed. Speeds and feeds are each controlled by a convenient lever fitted with direct reading plates. Reversing motor application takes the place of former mechanical reversing clutches in tapping. A lever at the left of the head operates push buttons controlling the forward and reverse rotation and the stopping of the spindle. A standard constant speed motor, suitable for about 20 reversals per min., is used in connection with a magnetic reversing starter. The spindle is mounted on anti-friction bearings. Spindle sleeves have been materially increased in diameter. The rack teeth are integral. A spring bumper effectively cushions the spindle return. These design changes in conjunction with heavier construction serve to eliminate rack and pinion difficulties. The housing of the box column is one-piece construction. Anti-friction mountings are employed throughout. Adaptability is provided to suit requirements in connection with multiple drill heads or gang-drill production.

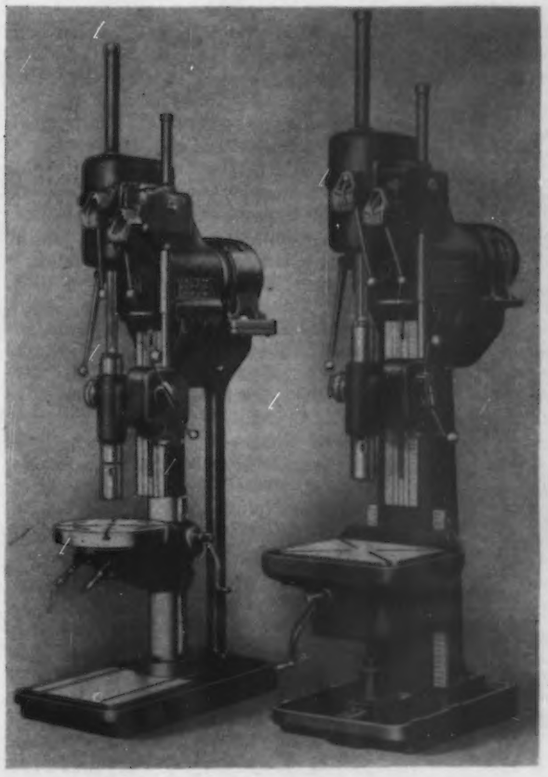
Threading Machine for Bolts and Variety Work

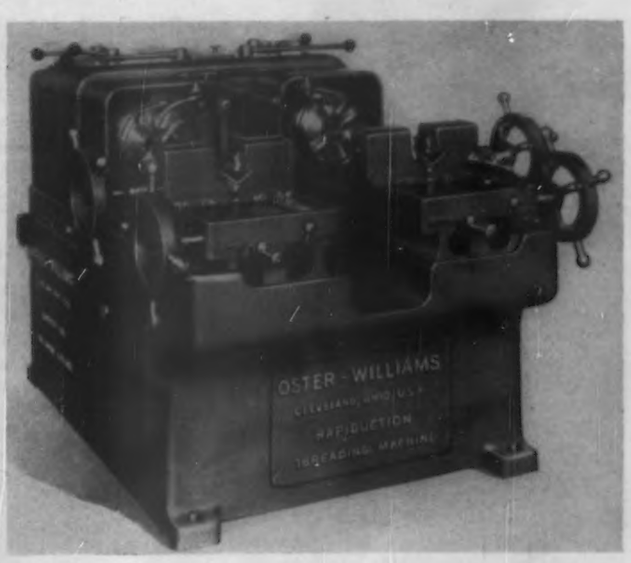
A NEW, No. 922, bolt-threading machine has been announced by Oster-Williams, Cleveland. Both single and double-spindle types, the latter here illustrated, are available. Standard bolt range covers all sizes from ½ to 2¼ in. at spindle speeds from 32 to 196 r.p.m. Spindle bore of 3¼ in. and a widely adjustable vise design permit of a large variety of work other than standard. The double-spindle machine is equipped with mechanical reverse for one spindle for the cutting of right and left-hand threads simultaneously. Spindles are turned from high-carbon steel forgings, heat treated and ground and mounted on pre-loaded tapered roller bearings. All driving and change-speed gears are chrome-nickel steel, hardened and ground, and run in oil. Heat-treated and ground headstock shafts are mounted in tapered bearings, automatically lubricated and adjustable. Rigid support and both lateral and vertical adjustments are provided for semi-steel vise carriages.

New Trade Publications

Compressors-Pumps.—Ingersoll-Rand Co., 11 Broadway, New York. Catalog 7502 D. Illustrated. Describes single-stage, single and twin-cylinder, and two-stage industrial compressors and vacuum pumps, ¼ to 15 hp., pressures up to 1000 lb. Compressors are listed with vertical or horizontal receivers and with electric motor, gasoline engine or belt drive. Tables, diagrams and applications are given.

Power Gun.—Alemite Corpn., Chicago. Catalog. Twenty-five pages, in natural colors, illustrating and describing equipment and accessories for practically all types of industrial lubrication. Minute details and specifications are supplied.





ABOVE

BUILT in both single and double-spindle types, this new bolt machine is offered for a wide variety of special work as well as for high production on standard runs.

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AT LEFT

THE 24 and 28-in. drills are provided with 12 spindle speeds from 60 to 1000 r.p.m. or 90 to 1500 r.p.m. Use of a reversing motor instead of mechanical reversing clutches is a new feature.

NEWS OF THE WEEK

C. A. McCune Awarded Miller Medal

Charles A. McCune, secretary, Magnaflux Corpn., New York, was awarded the Samuel Wylie Miller Memorial Medal for 1934, at the Sept. 30 session of the American Welding Society, which is holding its convention in Chicago this week.

Mr. McCune is one of the pioneers of welding and one of the founders

C. A. McCUNE

of the American Welding Society. Since 1919 he has served with distinction as chairman of the society's Committee on Filler Metal Specifications. In 1922 he was elected president of the A.W.S., and from 1923 until the present has served as treasurer. He has also been president of the International Acetylene Association and chairman of the Acetylene Development Committee of that association.

Mr. McCune received his education in general science at Cooper Union, New York. He was chief draftsman of the Safety Car Heating & Lighting Co., and in 1904 he became assistant engineer of the Commercial Acetylene Co., later advancing to chief engineer. In 1916 he joined the Page Steel & Wire Co., as sales engineer. From 1924 to 1930 he was director of research of the American Chain Co., resigning to become director of research of the Welding Engineering & Research Corpn. Following the dissolution of this corporation, he assumed his present position.

In 1905, Mr. McCune cooperated in developing the type of cylinders in use today for the safe storing and transportation of acetylene, and in devising other safety devices. With the Page Steel & Wire Co., he continued his early investigations in the field of welding rods and electrodes, and as a member of the Emergency Fleet Welding Committee he is credited with crystallizing specifications for these products. Mr. McCune is the author of numerous technical papers and is an active member of several engineering societies.

Torrington Co. Buys Bantam Ball Bearing

THE Bantam Ball Bearing Co., South Bend, Ind., and the Torrington Co., Torrington, Conn., have arranged for an exchange of stock, which has been approved by directors of both companies. The Bantam company will continue operations as heretofore in its factory at South Bend but as a subsidiary of the Torrington Co.

The Torrington Co. was originally founded in 1866 and today operates plants in Torrington; Orange, Mass.; Westfield, Mass.; Upper Bedford, Quebec, Canada; Coventry, England, and Aachen, Germany, where are made machine needles of all descriptions, bicycles and bicycle parts, ball and roller bearings, machine screws, swaging machines and metal specialties in a wide variety.

The Bantam company manufactures ball and roller bearings of all types in sizes up to 60 in. in diameter, supplying these for steel mills, paper mills, rubber mills and all other heavy-duty types of machinery, and has been for some time the largest supplier of needle bearings in the automotive, airplane and submarine industries.

It is the intention to maintain the newly acquired plant at South Bend, with no changes in personnel, at this time and with K. L. Herrmann, general manager of the Bantam company, continuing to act in that capacity for the new owners.

Valley Industrial Advertisers Organize

ADVERTISING and sales executives in Youngstown and surrounding area at a recent meeting formed an organization that has been designated as the Youngstown District Industrial Marketers. S. A. Knisely, advertising and sales promotion manager of Republic Steel Corpn., acted as toastmaster and temporary chairman at the organization meeting following a dinner at the Youngstown club. Speakers included Elmer Kopf, Union Drawn Steel Co.; R. S. Gildart, advertising manager, General Fireproofing Co.; S. A. Banks, McCaskey Register Co., and D. Clinton Grove, advertising director, Blaw-Knox Co., Pittsburgh, who delivered the principal address. Mr. Grove was elected third vice-president of the National Industrial Advertisers' Association at its recent meeting in Pittsburgh.

The organization has started with a charter membership of 35, which is expected to be increased to at least 60. The following temporary officers were elected to serve until the end of the year: President, S. A. Knisely; first vice-president, R. P. Dodds, Truscon Steel Co.; second vice-president,

R. E. McClure, McClure & Wilder Advertising Agency; secretary, Park Meek, Meek & Wearstler Advertising Agency, and treasurer, R. S. Gildart.

The organization will hold a meeting on the first Friday evening of each month which will be preceded by a dinner, and has arranged for a golf tournament to be held at the Southern Hills Country Club, Youngstown, Oct. 5. The group plans to ask admission to the National Industrial Advertisers' Association.

Republic Receives Advertising Prize

FOR the most outstanding advertising campaign of the year in the field of metals Republic Steel Corpn. was awarded first prize at the thirteenth annual conference of the National Industrial Advertisers Association held at Pittsburgh, Sept. 18, 19 and 20. The prize-winning campaign was created and placed by G. M. Basford Co., New York and Pittsburgh.

The convention program included an address by C. W. Ruth, assistant advertising manager of Republic, entitled "Shall Exhibits at Shows Be Used?" It was one of 10 in a symposium on the general topic, "How to Get the Most Out of the Selling Tools at Our Command."

Carnegie-Illinois Names Officers

THE filing of an agreement at Harrisburg, Pa., last week, forming the organization which will become the Carnegie-Illinois Steel Corpn., named the following officers: Benjamin F. Fairless, president; J. W. Hamilton, secretary; H. E. Jeffries, treasurer, and William Donald, auditor. The agreement also named the following members of the board of directors: W. A. Irvin, Benjamin F. Fairless, I. Lamont Hughes, G. C. Kimball, L. H. Burnett, William Donald, MacGilvray Shiras, William I. Howland, Jr., Carroll Burton, E. R. Stettinius, Jr., H. L. Austin, C. V. McKaig, Robert Gregg and R. H. Watson.

Lewis Foundry & Machine Co., Pittsburgh, a subsidiary of Blaw-Knox Co., has been awarded an order by Republic Steel Corpn. for two three-high mills complete with feeder and catcher-tables for use in its Warren, Ohio, plant.

PERSONALS

DR. JOHN S. UNGER, manager, research bureau, Carnegie Steel Co., Pittsburgh, has retired under the United States Steel Corpn. pension plan. Born in Tarentum, Pa., in 1865, he received his formal education at the Western University of Pennsylvania. In 1887, he started with the Carnegie Steel Co. as assistant chemist at the Edgar Thomson works; in 1892, he was transferred to the Homestead works of the company as chief chemist. He was appointed assistant superintendent of the armor department at Homestead in 1895, becoming superintendent of that department in 1897. In 1905 he became assistant general superintendent of the Homestead works, and in 1908 he was appointed manager of the central research bureau of the Carnegie Steel Co. He is a member of the (British) Iron and Steel Institute, American Iron and Steel Institute, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, American Society for Metals, Engineers' Society of Western Pennsylvania and American Railway Engineering Association.

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H. B. CARPENTER, manager of the Youngstown district of Republic Steel Corpn., has been appointed manager of the Corrigan, McKinney Steel Co. properties, following the ratification of the Republic-Corrigan, McKinney merger. He will have charge of the operations of the Corrigan, McKinney plant in Cleveland, the Newton Steel Co.'s sheet mill plants at Monroe, Mich., and the N. & G. Taylor tin plate plant at Cumberland, Md. Mr. Carpenter was born in Pittsburgh where he attended high school, and was graduated from the University of Michigan as a chemical engineer. He started working in the steel mills in Pittsburgh during summer vacations when he was 16 and after leaving college worked as a laborer in both blast furnace and open-hearth plants. After several years in the open-hearth department of the Cambria Steel Co., he became first helper in the chemical laboratories of that company and later superintendent of its coke plant. He next was assistant to the vice-president in charge of operations of the Colorado Fuel & Iron Co., and later manager of the steel plant of this company at Pueblo, Colo. He joined the Republic Steel Co. as manager of its Youngstown district in 1928 when that company took over the Trumbull Steel Co. He is president of the Lake Erie Limestone Co. Mr. Carpenter will have his headquarters at the Corrigan, McKinney offices in Cleveland.

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CHARLES H. ELLIOTT, heretofore manager of the Warren district of the Republic Steel Corpn., has been named manager of the combined Youngstown and Warren districts. F. E. FLYNN, assistant manager of the Warren district, has been named general superintendent of that district. R. L. LEVENTRY, assistant manager of the Youngstown district, has been promoted to general superintendent of that district.

Mr. Elliott will have under his supervision the Bessemer and Lansingville plants at Youngstown, the Trumbull-Cliff and Warren plants

JOHN S. UNGER

H. B. CARPENTER

CHARLES H. ELLIOTT

at Warren, and the sheet mill plant at Niles. He was born in Wilmington, Ohio, and graduated as a chemical engineer from Purdue University. His first job was as

F. A. BEATTY

a chemist in the laboratories of the Otis Steel Co. He served as open-hearth superintendent with the Colorado Fuel & Iron Co. From 1911 to 1919 he was assistant superintendent of blast furnaces and steel plant with the Youngstown Sheet & Tube Co. From there he went to Weirton Steel Co. for five years as manager of the blast furnace and steel plant department. During 1924 and 1925 he was general superintendent of the South Side works of Jones & Laughlin Steel Corpn. In 1926 he went to Warren to the Trumbull Steel Co. as manager of operations. He has been manager of the Warren district for Republic Steel Corpn. since the merger.

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F. A. BEATTY, who since 1927 has been chief engineer of Lewis Foundry & Machine Co., Groveton, Pa., a subsidiary of Blaw-Knox Co., has been made vice-president. He will continue to serve also as chief engineer. He joined the company in 1923 as assistant to the chief engineer. Previously he had been associated as a mechanical and structural engineer successively with Standard Plate Glass Co., American Rolling Mill Co., Spang & Co. and Jones & Laughlin Steel Corpn.

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L. J. LARSON, directing engineer in charge of the welding research laboratories of the A. O. Smith Corpn., Milwaukee, spoke on "An Exploration of a Modern Welding Act" at the first fall meeting of the Engineers Society of Milwaukee at the Wisconsin Club on Sept. 18.

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R. S. STRINGER, heretofore Philadelphia representative of the Baltimore Tube Co., Baltimore, which has been acquired by Revere Copper & Brass, Inc., has become identified with the Philadelphia sales office of the Revere company to handle the products of the Baltimore Tube Co. division.

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BENJAMIN SCHWARTZ, director general of the Institute of Scrap Iron & Steel, will lecture on scrap before the Chicago chapter of the American Foundrymen's Association, Nov. 11, at the Lewis Institute. Mr. Schwartz's talk is one of six lectures constituting a course arranged for the foundry industry in the Chicago district.

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C. E. BAYER, formerly open-hearth superintendent for the Great Lakes Steel Corpn., Detroit, has been made steel works manager of the Weirton Steel Co., Weirton, W. Va., succeeding H. E. MCDONNELL, who has been appointed blast furnace superintendent at Weirton. J. J. MUNNS, who has been associated with the Continental Can Co., has been appointed assistant vice-president of the Weirton Steel Co.

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HEBER G. STOUT, export manager of the Chain Belt Co., Milwaukee, has departed for Europe where he will make a study of business conditions and the probable effects a possible Italo - Ethiopian conflict might have on international trade. He will visit Holland, Germany, Belgium and England, and is expected to be absent two months. Last year Mr. Stout spent five months in the Far East.

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JAMES S. OGSBURY, formerly identified in an executive capacity with International Business Machines, Corpn., has been elected vice-president and comptroller of Whitman & Barnes, Inc., Detroit. ERIK ANDERSEN, treasurer of the company and its subsidiaries, has been elected vice-president and treasurer, with headquarters in Chicago.

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JAMES B. ALLINGTON, for the past 15 years industrial sales engineer for the Rochester Gas & Electric Co., has joined the sales force of the gas conditioning division of the Blaw-Knox Co., Pittsburgh.

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FRANK LIEBICH, who has been identified since 1924 with the industrial sales division of the Harnischfeger Corpn., has been made district manager in charge of the company's operations in the Detroit area.

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RAYMOND S. SIMMONS, for the past 16 years chief of the metallurgical and inspection departments of the Pittsburgh Steel Co., has been appointed executive head of the metallurgical department and technical experimentation and development of the Keystone Steel & Wire Co., Kokomo, Ind.

T. I. PHILLIPS, whose promotion to the general works manager-ship of the Westinghouse Electric & Mfg. Co. was reported in these columns on Sept. 5.

J. D. JONES, whose appointment as chief engineer of the Youngstown Sheet & Tube Co. was announced in these columns last week.

JAMES S. McKESSON, special sales agent to handle all sales of pig iron for the Carnegie Steel Co. His appointment was announced in the issue of Sept. 5.

Iron and Steel Electrical Engineers Hold Convention

THE thirty-first annual convention and exposition which the Association of Iron and Steel Electrical Engineers held in Pittsburgh Sept. 24 to 26 gave every evidence that the steel industry is feeling more prosperous than for several years past. This was indicated by the number in attendance at the technical sessions and in the exhibit halls, by the extent of the exposition, and by the general atmosphere which prevailed. Operating men and executives from most of the important steel centers of this country and Canada were present. Atlanta, Birmingham, Sault Ste. Marie, Chicago, and of course all the nearer districts were well represented. It was noticeable too that the attendance was by no means confined to electrical men. A very large percentage of those present were interested in other phases of mill operation, and a majority of the technical papers, something like 22 out of 30, were on non-electrical subjects. From remarks made by Mr. Walter H. Burr in the course of his report as chairman of the Electrical Developments Committee it would appear that the association is voting on a proposition to change its name, probably by dropping the word "Electrical" and assuming the more truly descriptive title of "Association of Iron and Steel Engineers."

Exposition Very Extensive

Exhibits of many kinds, of interest to steel men, filled to overflowing the two exhibit floors of the William Penn Hotel. Perhaps the one which provoked the greatest interest was the operating model of the Youngstown Sheet & Tube Co.'s continuous broad strip mill. This is a scale model faithfully reproducing the appearance and operation of the complete mill from slab furnaces to shear. Small lead slabs were discharged from an apparently white-hot furnace, rolled through the mill stands, and cut into lengths with a series of natural-sounding "thumps" as the elongated strip passed through the flying shear.

The exhibits of the various manufacturers covered a wide range. Among them may be mentioned transportation equipment, open hearth control, cranes, ball and roller bearings, lubricants, gears, couplings, motors and control, switchgear, cables, brushes, illumination, arc welders, gas welding and cutting equipment, and many more. The exhibit halls were thronged every afternoon and evening. The visitors seemed in the main to have real interest rather than idle curiosity. The exposition was under the management of Thomas B. Little, acting managing director of the association.

Weirton Inspection Trip

On Wednesday afternoon, Sept. 25, a special train carried a large number of members and friends—estimated at 700 or more—to Weirton, W. Va., for an inspection of the Weirton Steel Co.'s mills. Among the various sections of the plant visited were the following: the steel works, including blast furnaces, open hearths, blooming and bar mills, and structural mills; the sheet mills, including annealing and pickling departments; the strip mills, including 10 in. and 16 in. hot strip mills, and the accompanying cold strip mills and pickling department; the wide strip mill, comprising the 48 in. continuous broad strip mill, single, tandem and Steckel cold strip mills, and the finishing department. This 48 in. broad strip mill was the first of the truly continuous broad strip mills to be installed, going into operation in 1927.

A particularly interesting mill is the four stand tandem mill cold rolling tin-plate strip at a delivery speed of 800 to 1000 feet per minute. The strip enters the mill about 0.08 in. thick and is reduced to approximately 0.01 in. in four continuous passes, and coiled on a tension reel. From this mill the strip passes to a continuous electrocleaner located alongside it, and then directly into a flying shear and piler. The piled sheets then go to the annealing furnaces.

Address on "Industrial Relations"

An outstanding feature of the convention was an address by Mr. Arthur H. Young, vice-president in charge of industrial relations of the United States Steel Corpn. He was introduced by Mr. Charles R. Hook, president of the American Rolling Mill Co., who presided at the session. Mr. Young was quite emphatic in his statement that the system of employee representation which has been developed in many steel organizations is far superior to any plans so far proposed by the National Labor Board. He compared the problems of the board to those which would confront a commission attempting to regulate the relations of all married couples.

He said that under the employee representation plans both management and employees get a mutual understanding of each others' problems, much better than any outside agency can possibly have. Such understanding is highly essential to the satisfactory settling of any controversial question.

He emphasized the importance, and the intricacy, of industrial relations, which are in reality human relations. Methods of handling industrial relations have been changing and improving, just as have the methods and technique of the electrical or the safety engineer. Changes will continue, possibly at a far greater rate than in other lines of endeavor.

Mr. Young pointed out that while the "NEW DEAL" advocates tell us, as a new discovery, that the workers' chief concern is for security of life, employment and livelihood, in reality such security has been the concern and objective of industrial management generally for years past. To prove this he cited the formation of the National Safety Council some 20 years ago, and the far-reaching strides toward safety on the job which have been and are being made. The workers' old age pension systems and unemployment relief plans of many large corporations are other evidence that industry generally has long appreciated and tried to fulfill the workers' desire for security. The U. S. Steel Corpn. alone has disbursed more than $60,000,000 as pensions to retired employees.

With an appreciation of the problems involved in industrial relations, the employee representation system has been evolved and has functioned very successfully.

Mr. Young's address received

(CONTINUED ON PAGE 74)

THIS WEEK IN WASHINGTON

Roosevelt launches campaign for reelection; pictures New Deal as savior of business. . Omits to mention that upturn followed famous Supreme Court decision.

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Coal consumers and their customers will underwrite benefits to United Mine Workers from new coal agreement.

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President now disposed to leave to business the decision as to whether the long defunct Blue Eagle should be buried or stuffed. Major Berry is made keeper of the morgue.

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Hopkins, champion lightweight spender, wins decision and boondoggling purse over his heavier but slower adversary, Ickes.

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BY L. W. MOFFETT

Resident Washington Editor, The Iron Age

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WASHINGTON, Oct. 1.—The one-week coal strike has ended. . . . PWA and housing allotments have been completed. . . . The President has made a gesture to business by saying further NRA legislation is up to it. . . . AAA is sitting in on a three-cornered row among farmers, packers and consumers as a scrap rages over processing taxes. . . . After putting in a busy four days in Washington after returning from Hyde Park, the President and party have left on a long transcontinental trip. . . . Called a much-deserved vacation for the President by his supporters, anti-New Dealers dub the trip a political jaunt marking the personal launching by the Chief Executive of his campaign for reelection.

Snapping, snarling and joking since last February, coal operators in the Appalachian district and the United Mine Workers, led by President John L. Lewis, after five "truces" came to wage and hour terms, with victory on the side of the union. . . . The union got a new contract, to expire April 1, 1937, calling for an increase of 50c. a day for day workers; an increase of 9c. a ton for mining and loading coal, and an increase of 10 per cent in wages for "deadwork." . . . The demand for a 30-hr. week was turned down, leaving the 35-hr. week in effect. . . .

Operators say the increase in costs will be about 15c. a ton. . . . Estimating an annual production of 350,000,000 tons, this means virtually $1,000,000 a week, to be passed on to the consumer, including the iron and steel industry. . . . Assuming 1½ tons of coal to one ton of coke, this means an increase of 22½c. per ton in the cost of making coke, with resulting higher costs in making pig iron and steel. . . . As a result, it will also increase the use of gas and oil, with further dwindling of markets for the coal industry, long bedeviled and now to be further bedeviled. . . .

The strike probably would have been of short duration, but after miners actually had laid down tools, high pressure was brought to settle the long-drawn-out dispute. . . . It will be recalled that the President urged passage of the Guffey coal bill, however reasonable the doubt as to its constitutionality, in order to avert the strike, a position he took at the suggestion of the union. . . . Yet little heed did the union give to its strong implication that it would not press its demand to the point of a strike if the Guffey bill were enacted into law. . . . The suggestion appeared to be that the union would wait to see what benefits this act to "stabilize" the market would have before insisting on new contracts. . . . Now if it has labor trouble, as it probably will, despite the new agreement, it will be laid before the newly created Bituminous Coal Labor Board, which with the Bituminous Coal Commission, will find plenty of work cut out for them. . . .

Just before he boarded his train for the Western trip, the President hastily penned a note to the busy Edward F. McGrady, himself an organized labor leader, in recognition of the strenuous job he did as Assistant Secretary of Labor in finally bringing about a settlement between the operators and the union, leaving unsettled, however, the sharp conflict between operators themselves over differentials. . . . The President said he was "made happy by your good news," referring to McGrady's message conveyed to the White House that the agreement finally had been reached. . . . The agreement, the President

stated, "will make my long-deferred vacation a great pleasure," and he added that "this is a splendid example of the usefulness of the principle of collective bargaining to which we are committed." . . . Lewis boasted that "we got everything we wanted," forced upon the industry under pressure. . . . A glorious example of "collective bargaining."

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About Face on NRA

The President's comments last week leaving it up to industry as to whether there would be new NRA legislation at the next session were puzzling and had the appearance of a face-about. . . . For on the eve of its recent adjournment, the President sent a message to Congress strongly urging NRA legislation at its next session. . . . Now, however, he said that if industry itself can eliminate unfair trade practices and chiseling, there is no need for such legislation. . . . The changed Presidential attitude was interpreted as a gesture toward prolonging the promised "breathing spell" for business, and to indicate an effort to mollify business and industry, which clearly have shown a rising hostility to the New Deal as it strikes out on its campaign to continue itself in office. . . .

The President said, however, that if chiselers break down advantages of NRA, something ought to be done. . . . Although Representative Hill, chairman of a subcommittee of the Ways and Means Committee, recently announced that a tentative NRA bill had been drafted and hearings would be held on it beginning about Nov. 15, the President said that no thought had been given to specific NRA legislation. . . . It is possible, of course, though previously it had been thought improbable, that the proposed bill was drawn without first getting White House scrutiny. . . .

The President's NRA message was accompanied by a table based on reports from "field workers" to show widespread breakdown of code provisions by all classes of industry and business. . . . But at his press conference the President said reports from 900 "field workers," checking on code abandonment, showed that in most major industries code provisions are being adhered to, though in all industries there were some chiselers. . . . It's quite confusing. . . .

The thought in Washington grows that business and industry generally are pretty well weaned of NRA and that this has been an important factor in the present attitude of the Administration in not pressing for further Blue Eagle legislation. . . .

Even NRA's most zealous supporters, including Don R. Richberg, former head of NRA, now admit they overdid the job of predicting chaos if NRA was abolished. . . . In an interview last week, Mr. Richberg, conceding his Cassandra-tone was off-key, saw in place of "industrial chaos" the setting in of recovery. . . . He gave NRA a crumb, however, as he pointed out that it developed "collective thinking" in industry with resulting improvement in working conditions and elimination of unfair trade practices. . . .

There is, obviously, no copper-riveted guaranty that the President will not ask for new NRA legislation. . . . Policies are shifted too often, sometimes going in six directions at the same time, that what exists today is outmoded the next. . . . And hardly had the President indicated that industry would be the arbiter as to whether there would be further NRA legislation when he selected an organized labor leader, Major George L. Berry, as "coordinator for industrial cooperation." . . . This high-sounding designation would seem to mean that not only has business been assured a "breathing spell," but that it is even to be coddled just a bit at least. . . . Yet in some quarters the selection of Major Berry, president of the Printing Pressmen's Union and official of the American Federation of Labor, was looked upon as a move to determine by investigation if new NRA legislation should be pressed. . . . If not, what might the Government do to replace entirely the NRA, which, unless prolonged by Congress, expires April 1, 1936? . . .

The President authorized Major Berry to supervise conferences on business recovery and "to coordinate and report to the President on matters relating to appointment, employment, discharge and duties of officers and employees of the National Recovery Administration. . . . Major Berry, long a prominent figure in NRA, followed up with a statement crediting NRA with making "a very great contribution not only to recovery but to the removal of the cause of economic distress," and, as if advocating its continuation, saying that "a permanent institution that will prevent the character of cut-throat competition, which was largely responsible for the depression, is of first importance." . . . He said he thought that management and employees in all industries want a fair trade practice law. . . . Then he proceeded to "cordially invite the representative men and women of industry—both management and labor—to counsel with me." . . . He promised cooperation to the fullest degree with management and labor "to the end that the present and future stability may be assured for their good and for the nation's welfare." . . . As yet there have not been flocks of industrial visitors coming up to see Major Berry. . . . No doubt he will be called upon by segments of management and greater segments of organized labor, but it is predicted that leaders in some of the large industries who acclaimed the downfall of NRA will not be among those present. . . .

The President also instructed Major Berry to receive reports from the Federal Trade Commission on voluntary trade practice agreements and the assumption is that the order provides for machinery for effectuating the agreements, the first one of which, relating to the wholesale tobacco trade, has just been announced by the FTC. . . . In passing, it may be noted the FTC for the first time was authorized by the President to include labor standards in agreements. . . .

The President may even forego demand for action on the Walsh bill calling for adherence to code provisions by Government contractors. . . . He said he would ask for passage of the bill at the next session only if chiselers make it necessary. . . . Thus again the President turns to industry and apparently leaves to it the fate of the bill, which failed of enactment at the recent session. . . . Heretofore he disregarded opposition by industry to the measure. . . .

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Hopkins To Run Boondoggling

Giving Harry L. Hopkins, works progress administrator, the lion's share of the huge works relief fund, which he is disbursing to stimulate the boondoggling industry, the President pushed the highly vexatious and shifting program into its second stage and then took Mr. Hopkins and Harold L. Ickes, public works administrator, along with him on his trip. . . . They left their spending burden to the subordinates. . . . Perhaps this was to show that distinctly sharp differences between the two doughty administrators had been patched up, if not forgotten. . . . And just before the vacationists left Washington, Mr. Ickes announced that the President had approved 3340 additional PWA projects and had allotted an additional $200,139,037 in grants representing a governmental contribution of 45 per cent toward the total cost of the projects which Mr. Ickes is depending upon to be of great help to the durable goods industries. . . . Of the 3340 projects included in the list of the new program, 1931

are schools, 139 hospitals, 120 disposal plants, 385 waterworks, 155 sewer systems and extensions to sewers, 77 electric power plants, 12 gas plants, 56 highways, 86 city streets, 27 municipal buildings, 11 libraries and 28 charitable and penal institutions. . . . Allotments from PWA now are completed. . . . Those made last week, plus a previous total of $116,300,000, represent but slightly more than the $900,000,000 provided by law and originally proposed. . . . The housing program announced provides for 37 projects to cost $100,193,000, also about only one-third of the total originally proposed for this purpose, and even some of those approved may be abandoned because of inability to get them under way within fixed limits. . . . Those not approved will not be started. . . .

So the big task of putting 3,500,000 employables to "work" by Nov. 1 rests largely with Mr. Hopkins, and it is freely predicted that he cannot possibly find enough boondoggling even to approach such an accomplishment, his assurance to the contrary notwithstanding. . . . The significance is evident, showing as it does the tremendous number to remain idle and in want unless by some good fortune they can be absorbed in part by private industry. . . . It is easy to understand the direful forebodings of General Johnson as to what will happen after the vain outpouring of mountainous sums from the Federal treasury. . . .

For the imported theory of spending our way to prosperity has fallen flat. . . . The stark spectre of widespread unemployment still stares the nation in the face. . . . The recovery movement is not absorbing the idle nearly fast enough to solve the knotty, ugly problem. . . . And it will be solved only by restoration of the great bulk of the unemployed to private payrolls. . . . Industry has its responsibility, but to lay this wholly at industry's door is quite another thing. . . . It can't do the impossible, and if it had been less heckled many of its leaders are convinced that confidence long ago would have been restored and unemployment reduced to only a fraction of what it now is. . . . General Johnson's yen for alliteration, let it be hoped, was the only reason he broke out with prophecy of riot, rebellion and revolution, if private industry did not solve the problem of unemployment instanter. . . . Extravagant language does no good, though the gravity of the situation calls for strong emphasis. . . .

Meanwhile, the country would hail loudly industrial statesmen who can devise ways and means of relieving the situation. . . . President Roosevelt last week urged at the meeting in Washington on mobilization for human needs that private charity take over the relief burden and called upon everyone to help. . . . This showed another turn to private industry, as well as to individuals, for help, and whatever industry may be able to do will be partially on account of defeat of the President's tax proposal to assess industrial gifts to charity. . . . Can it be that there is a faint suggestion that "rugged individualism" reassert itself? . . . But business, hamstrung and taxed to the eyebrows, cannot be held responsible for a situation created by the Government itself. . . .

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Aftermath of Great Pig Slaughter

Repercussions from the widespread pig slaughter came with a bang to AAA as it listened to farmers, consumers, butchers and packers at a two-day hearing last week. . . . Farmers naturally enjoy emoluments from processing taxes . . . yet many of them even have become dubious of the curtailment program inasmuch as they are piling up a surplus of corn that cannot be consumed since the little piggies went to market by the millions. . . . Housewives, representing organizations, were militant and told of strikes against sky high prices of bacon, ham and pork. . . . Butchers told of disappearing markets for pork, and packers called for abolition of the corn-hog reduction plan, including the processing tax, as they insisted that the emergency on which the program was based is over. . . .

AAA, once thoroughly assured of the "soundness" of its program, now is about to do another of those about-faces so common to Washington. . . . The hearing likely will be used as a vehicle through which the program will be reversed, and it has been indicated that, instead of getting paid for having his pigs slaughtered, the farmer will be paid for increasing the 1936 production! . . . That's planned economy! . . .

Just as an example of the many economic, labor and industrial ramifications of the hog-curtailment program, it is only necessary to cite one of its many aspects as set forth by William Whitfield Woods, Chicago, president, Institute of American Packers. . . . Mr. Woods pointed out that at the present rate of productivity, approximately 34,000 additional workers would have been required and additional wage payments amounting to $40,000,000 would have been made this year in the packing industry alone had the supply of hogs been equal to that of 1933.

"The effect of employing 34,000 additional men can be in some measure imagined," he said. "These men would need additional knives, aprons, boots, supplies and machinery wherewith to do their work. The production, transportation, and distribution of these implements, supplies and machinery would give employment to other men. The same thing is true of the additional hogs that would be raised and marketed. Feed, fences, lumber, trucks, tires, gasoline, railroad cars, etc., would be required in additional quantities. As the product was accounted for, transported, distributed and merchandised, additional workers also would be required. The purchases of the various additional men and women would increase trade."

All of which points to an important reason for an upset economic order with resulting and continuing unemployment of millions. . . .

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Large PWA Allocations

The President has approved a PWA loan and grant of $10,000,000 to the Central Nebraska Public Power and Irrigation District to start construction on the tri-county power and irrigation project; an allotment of $1,575,000 from the works-relief appropriation to be spent in the construction of the new State Capitol building in Salem, Ore., and a PWA allotment of $500,000 for preliminary work on the Santee-Cooper hydro-electric navigation project in South Carolina.

The Central Nebraska power and irrigation project will consist of two reservoirs, one of 209,000 acre-ft. capacity and the other of 300,000 acre-ft. capacity, 35 miles of irrigational canals, three hydroelectric plants of 32,500-kw. capacity and an electric transmission and distribution system.

The total cost of the Capitol Building for Oregon will be $3,500,000.

The Santee-Cooper project is estimated to require $37,500,000 for completion. It will provide facilities for the production of 630,000,000 kwhr. of power annually, and also provide an inland waterway connecting Columbia and Charleston, S. C., via the Congaree, Santee and Cooper rivers and then by intracoastal waterway to Georgetown.

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NRA Officials Resign

Resignations of prominent NRA officials have once more thrown what is left of the old Blue Eagle organization into confusion, and further lowered its already low morale. Further departures from

the once potent industry-regimenting body are expected on a scale that will resemble a widespread emigration.

The first resignations were announced last Friday, following the Presidential appointment on the previous day of Maj. George L. Berry to "coordinate and report" on duties, compensations and functions of NRA officials. Officials resigning either would not comment or denied they were leaving because of the selection of Major Berry to this position. There was, nevertheless, considerable buzzing as to the meaning of the Presidential order and concern lest it meant Major Berry had been raised to a position to oversee heads of the organizations.

The first resignations were those of Prentiss L. Coonley who said he was going to return to private business. Willard Thorp, economic adviser to the NRA Advisory Council, has become associated with Dun & Bradstreet, New York.

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Additional Steel Bids Asked by Navy

The Navy Department has issued additional invitations for bids for steel for vessels to be built in navy yards. On Oct. 15 it will open bids for 2955 tons of plates and 135 tons of special structural tees for three submarines, two to be built at the Mare Island, Cal., and one at the Portsmouth, N. H., Navy yards. The plate requirements consist of 2835 tons, 7.65 lb. per sq. ft. and heavier, and 120 tons under 7.65 lb. per sq. ft.

On Oct. 22 bids will be opened for 3711 tons of plates for seven destroyers, 2468 tons to be 7.65 lb. per sq. ft. and heavier, and 1243 tons to be under 7.65 lb. per sq. ft. Two destroyers each will be built at the Charleston, Mass., and the Portsmouth, Va., navy yards and one each at the Charleston, S. C., Bremerton, Wash., and Philadelphia navy yards.

Bids also will be opened on Oct. 11 for 37½ tons of wide plates, rolled by only one mill, for the light cruiser, *Wichita*, building at the Philadelphia Navy Yard.

Joseph Schlitz Brewing Co., Milwaukee, is entering the field of marketing beer in cans, under an arrangement with the Continental Can Co., which recently reported perfection of a lined beer container, a feature of the design of which is that it is capped in a manner similar to glass beer bottles, as distinguished from the flat-topped product manufactured by another company.

British Iron Markets Strong Because Of War Possibilities

LONDON, Sept. 30.—(*By Cable*)—Pig iron consumption is heavy. Only a small surplus is available for the open market and low stocks are being reduced further. Heavy inquiry for forward dates is probably due to fears of higher prices. Purchases of foreign semi-finished steel are still impossible and British makers are meeting requirements with difficulty. Autumn trading in finished steel is developing favorably and further impetus is expected from forthcoming naval program. Light sections are particularly active and rails and ship plates are improving. Motor manufacturers are increasing contracts for special strip. The international crisis is introducing a note of caution in certain export markets.

Tin plate inquiry is considerable and fair business is being booked. Output is at the maximum permitted under the international agreement. The home trade is most active but exports are broadening with South America and Belgium the best customers.

Continental iron and steel markets are quiet with certain works restricting output. Business in thin sheets is active.

The cartel is meeting in London Oct. 3 to discuss export agreements with the United Kingdom, the advisability of raising export prices and the formation of an international thin sheet cartel.

Compania Belgo Mineira, Brazil, is erecting two blast furnaces, steel works and rolling mills in Rio Doce Valley.

National Carbon Co., Inc., 30 East Forty-second Street, New York, has been appointed sales agent for the Soderberg (self-baking) electrode for the United States and Canada.

Welding Equipment.—Lincoln Electric Co., Cleveland, booklet of 44 pages, describing method of controlling arc in company's Electronic Tornado system of automatic carbon arc welding and method of shielding carbon arc with three types of autogenizers. Physical properties of welds are given to show advantages of this method. Table shows costs and speed of welding by this process. Many pages of text and illustrations are devoted to list of applications of this system of welding, data including length of welds and production speeds.

Arc Welding Electrodes and Accessories.—Lincoln Electric Co., Cleveland. Catalog, 36 pages, devoted to descriptions, applications, and procedures for 16 Lincoln arc welding electrodes. Metal and carbon electrode holders, cable and cable accessories, protective shields and protective clothing, wire brushes and other accessories are included. Data sheets, handbooks and other publications of the company are listed.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hearth	£5 10s. to £5 15s.
Tin plate, per base box	*18s. 2d. to 18s. 7½d.*
Steel bars, open-hearth	£7 17½s.
Beams, open-hearth	£7 7½s.
Channels, open-hearth	£7 12½s.
Angles, open-hearth	£7 7½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s.

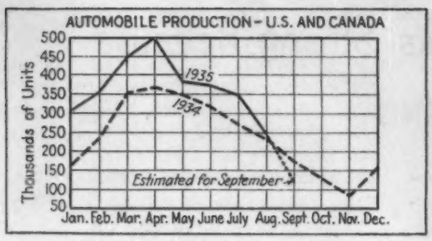
*To Jan. 1: 18s. 3d. to 18s. 10½d thereafter.

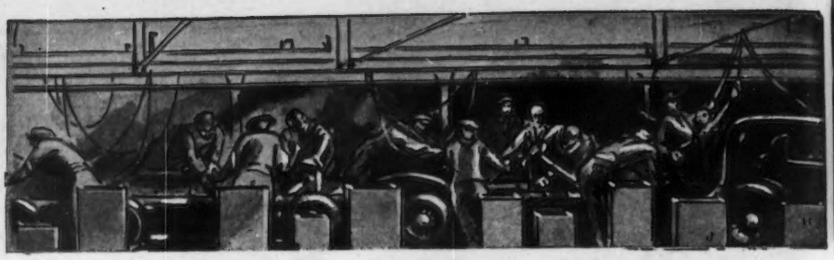
Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel Bars, merchant	£3 5s.
Sheet bars	£2 8s.
Plate, ¼ in. and up	£4 2s. 6d.
Plate, 3/16 in. and 5 mm.	£4 4s. 8d.
Sheets, ⅛ in.	£4 9s. 8d.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.	£8 15s.





THIS WEEK ON THE

Automotive Activity Resembles That Usually Seen in Spring Months

DETROIT, Oct. 1.

THE bustle of automotive activity in southern Michigan makes one think more of March or April than of October. The congestion of traffic as heavily loaded trucks lumber from parts factories to automobile plants, the buzz of excitement around employment offices of car manufacturers, and the tempo of production as stocks of parts are built up ahead of assembly line requirements are outward manifestations of a prosperous automotive community.

There isn't going to be any poking along with half-hearted operations this fall. Managements are demanding that there be no serious delays in getting cars into the field. Prodded on by the higher-ups, production executives are putting on the pressure to secure high output in as short a time as possible. This is especially true in General Motors, whose officials still are irked by the costly experiences of the last two years, particularly in Chevrolet.

One must go back many years to find a time when the industry was so suffused with enthusiasm about the outlook as at present. This optimism is well-founded. Car manufacturers are entering the final lap of a year in which assemblies will total 3,700,000 units, the largest volume in six years and a figure exceeded only four times in the industry's history. Truck sales in 1935 may equal or possibly pass those in 1929. Sales overseas of American-built cars are expected to be 530,000 units for the year, compared with a depression low of 180,000 during 1932.

Quotas fixed by individual companies for 1936 are stiff. In fact, the high goals established by sales managers are bound to result in a competitive fight for business such as the industry hasn't seen recently. If every maker attains its bogey, production and sales next year will run around 4,500,000 units. This seems a little high as an anticipated total, but chances are good that the industry will not be far from it by the end of 1936.

The tuning up of factory field staffs and the influx of dealers and distributers to get a preview of new models continue merrily on. Oldsmobile, Pontiac, Hudson, Buick, Auburn and Packard are among companies which have held powwows. Plymouth will reveal its 1936 plans to dealers assembled in various cities over an international radio hook-up next Thursday noon to which competitors as well as the general public can listen. The high command of General Motors—Alfred P. Sloan, Jr., William S. Knudsen and Donaldson Brown—made a tour of the corporation's outposts the past week, stopping at Lansing, Flint, Pontiac and other southern Michigan points. They found production clicking along smoothly.

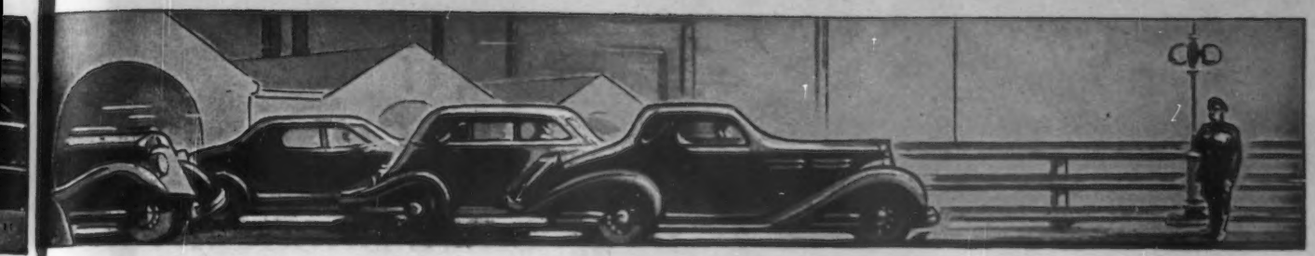
Announcement dates are to be pretty well scattered through the month of October. Buick and Packard already are in the open. Ford is said to be planning on public presentation of new models Oct. 5 or 12, with strong likelihood that the latter date will be selected. That the event is near is indicated by removal of all cars from the show windows of Ford's Highland Park plant and the veiling of this space from public view. Ford will be the first of the Big Three to offer its new line.

Contrary to the report published in this column a week ago, the new Plymouth will retain the fabric top for 1936, although Dodge will have a steel top in the form of a welded insert. Plymouth is altering its appearance only slightly, but is understood to have widened and lengthened the room inside the body and to have made improvements which result in easier steering. Like many of the cars under $1,000, Plymouth has put additional weight into its 1936 jobs.

Auburn to Be "Different"

Two companies which are staking their hopes on a comeback next year are Auburn and De Soto. Auburn will have its "stunt car" powered by a Cummins Diesel engine for anyone who wants to have one built to order. It also will have the sensational Cord with teardrop design, retractable front lamps, front-wheel drive, supercharger and low overall height and road clearance rivaling those of William B. Stout's much-talked-about Scarab. The regular Auburn line also will be of advanced styling. Auburn's products the coming year will be in line with President Roy Faulkner's belief that a small independent car maker can get nowhere by competing directly with larger manufacturers with a "volume car," but must instead appeal to a different class of buyer who is attracted to something "different." This is the basis on which Mr. Faulkner hopes that Auburn again will find a place for itself in the automotive sun.

As for De Soto, Chrysler executives appear enthusiastic about its possibilities. An attempt will be made to make the new Airstream De Soto a car which everyone will recognize on the road, just as one



ASSEMBLY LINE

BY BURNHAM FINNEY

Detroit Editor, The Iron Age

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has been able to pick out a Pontiac the past year by its silver streak. The trouble with cars lately is that they have looked too much alike. De Soto is said to be taking its so-called "squirrel cage" front-end design of a few years ago and modernizing it completely so that it will have a distinctive appearance of its own.

Hudsons and Terraplanes the coming year will switch over from mechanical to hydraulic brakes. Both cars also have made changes in the front end of the chassis which it is claimed will give the equivalent of knee action. Incidentally, there seem to be no further converts to independent front-wheel suspension, General Motors remaining the most loyal adherent of this system.

Industry Looks to 1937

An almost unprecedented situation exists in the industry in that every manufacturer is busily engaged in girding itself for 1937, even before the 1936 season gets started. Never have preparations a year ahead been so intense or on such an extensive scale. This is due to the realization that the industry must present products in 1937 in completely new dress instead of in the same clothes with a fresh shirt and tie, as intended for next year. Designers of 1937 models are working overtime at present and the research and development departments of parts companies never have had more to do.

At least two or three new motors are looked for a year hence, of which one will be for Chevrolet. It will not be surprising if more than one manufacturer in 1936 makes that break with tradition which is coming sooner or later and moves the engine to the rear of the car. Large volume companies can't afford to experiment, but some of the smaller makers, perhaps in one case a division of a prominent corporation, may bid for public favor with rear-engine jobs.

The major changes which loom a year ahead should be a boon to the machine tool industry. Car manufacturers, too, will feel that they can afford to make large capital expenditures, since the rich market in 1936 should yield substantial profits. Equipment buying for 1937 is apt to begin early next year because of the length of time it will take to effect radical mechanical and production changes and also because the automotive industry finally is alert to the fact that equipment makers are booked from two to four months in advance.

Parts releases are coming through at an accelerated pace. Plymouth has instructed forging suppliers to ship around 30,000 pieces (one to a car) in October and 65,000 in November and it probably will advance the date when all this material must be in its plants. Not even in peak months of the year have many automotive factories had bigger stocks of parts piled on their premises awaiting assemblies. Pontiac is up to 500 cars a day and one day the past week it built over 800 cars. It hopes to make 14,000 cars in October and 48,000 the remainder of the year.

Selling of Blanks Spreading

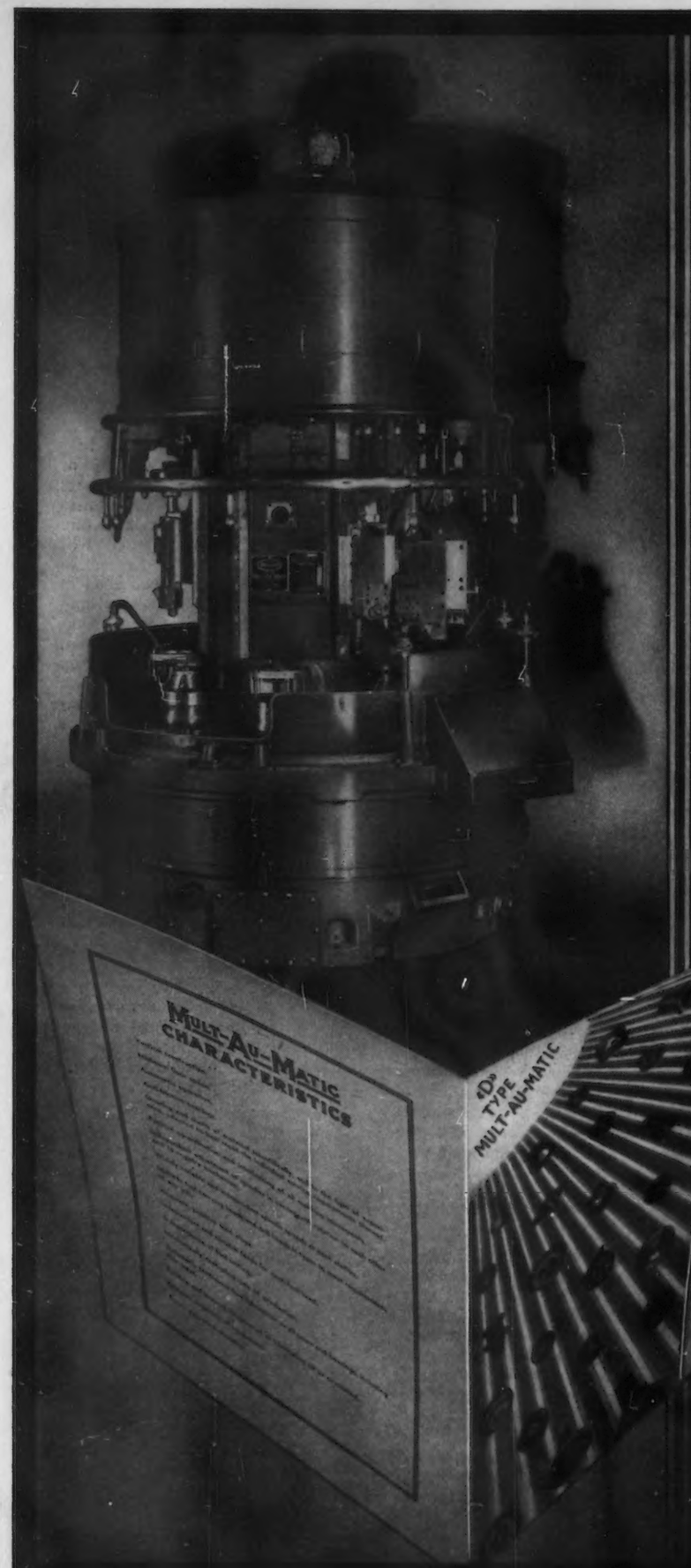
With the opening of the 1936 car production season, the practice of sheet and strip steel mills of selling blanks is rapidly spreading. Several companies which heretofore have refrained from doing any blanking have recently installed presses, claiming that this course became necessary if they expected to retain valuable automotive accounts. The main saving to the user appears to be in transportation costs, since it is not necessary to ship that part of the steel to be scrapped from the mill to the consumer's plant and then back to the mill. There also is economy in handling blanks rather than bulkier stock in the user's factory.

Faced with the problem of taking care of increased volume of business the coming year, parts makers and stamping companies have had to decide whether to buy additional equipment or let part of their work to outside firms. In some cases the decision has been in favor of having other shops lend their assistance, stamping companies as far distant as Chicago and Indianapolis benefiting from this overflow. It has been found most advantageous in certain instances for parts makers to have outside companies perform two or three operations on a part and then pull the parts into their own plants to be completed. This policy isn't much help to equipment builders who are urging parts manufacturers to buy additional machinery, but it has distributed automotive work more widely through the Middle West than it otherwise would.

The delicate labor situation which has existed in the automobile industry for the last two years has made most factory executives touchy about the subject of cutting down manpower. Publication of stories about installation of "labor-saving" machinery is taboo.

There is no desire on the part of management to reduce the present high hourly rate of factory workers. Competition makes it necessary, however, to keep manufacturing costs down as low as possible. It is not so difficult, therefore, as it was even six months ago, to sell automotive executives new equipment which will combine two or more operations or otherwise pare costs. One machine tool man remarks that "it is much easier than in years to get a hearing for one's product. Car manufacturers realize that modernization of machinery means not only economical production, but also improved quality."

Chevrolet is now buying tool room equipment for its new transmission factory at Saginaw, a number of orders already having been placed.



TWO CHUCKINGS

. . . on the

SAME MACHINE

DOUBLE INDEXING — a feature of Bullard Mult-Au-Matics for thirteen years permits First and Second chucking on the same machine.

On Mult-Au-Matics of the Six-Spindle type—two stations are given to loading with four work stations for operations—two to each chucking.

The Eight-Spindle Mult-Au-Matic provides two stations for loading with six work stations for operations—three to each chucking.

In your production line, this means your choice of one of three things—First and Second chucking of the same piece, thereby producing one completed piece at every index—or two identical pieces with identical operations—or two different pieces, such as mating flanges, each machined to its own specifications, "pairing-up" at completion of operations.

DON'T OVERLOOK—in your equipment, comparisons, and purchases, the fact that many, many hundreds of Mult-Au-Matics have proved so Profitable as to warrant further investments in New Mult-Au-Matics for replacement requirements.

The

BULLARD COMPANY

Bridgeport, Connecticut

August Exports and Imports Decline

Exports (In Gross Tons)

Articles	August 1935	August 1934	Eight Months Ended August 1935	Eight Months Ended August 1934
Pig iron	570	285	2,113	2,238
Ferromanganese	2	26	41	44
Iron and steel scrap	156,685	155,542	1,481,132	1,050,202
Tin plate scrap[5]	2,779	....	28,168	....
Waste-waste tin plate	1,417	....	15,289	....
Pig iron, ferroalloys and scrap	*161,453*	*155,853*	*1,526,743*	*1,052,484*
Ingots, blooms, billets, sheet bars	3,657	65	33,655	8,781
Skelp	12,117	8,770	29,383	59,220
Wire rods	2,692	1,414	16,678	17,788
Semi-finished steel	*18,466*	*10,249*	*79,716*	*85,789*
Steel bars	3,545	2,676	35,455	26,874
Alloy steel bars	191	116	1,523	1,961
Iron bars	52	115	710	716
Plates, iron and steel	3,706	3,776	26,484	25,150
Sheets, galvanized steel	5,060	6,398	50,167	42,715
Sheets, galvanized iron	110	103	1,176	989
Sheets, black steel	7,840	8,568	68,716	58,929
Sheets, black iron	403	527	3,617	3,252
Hoops, bands, strip steel	3,856	1,840	28,815	21,004
Tin plate and taggers' tin	12,430	11,579	76,118	122,676
Terne plate (including long ternes)[5]	148	....	1,551	....
Structural shapes, plain material	2,767	3,251	20,645	20,203
Structural material, fabricated	983	1,836	15,333	11,970
Tanks, steel	611	394	4,319	4,546
Steel rails	7,995	6,248	34,777	53,231
Rail fastenings, switches, spikes, etc.	803	1,233	6,557	12,824
Boiler tubes	667	1,080	5,922	4,869
Casing and oil line pipe	1,470	8,291	20,784	47,758
Pipe, black and galvanized, welded steel	2,154	3,723	23,845	29,710
Pipe, black and galvanized, welded iron	231	351	2,210	1,671
Plain wire	3,900	3,532	25,132	25,440
Barbed wire and woven wire fencing	2,801	3,752	22,284	26,220
Wire cloth and screening	96	133	710	615
Wire rope	260	158	2,797	1,845
Wire nails	962	996	7,110	9,378
Other nails and tacks	299	487	2,495	3,578
Other wire and manufactures	399	323	3,476	3,295
Bolts, nuts, rivets and washers, except track	469	463	4,273	3,280
Other finished steel	192	183	987	1,192
Rolled and finished steel	*64,400*	*72,132*	*497,988*	*565,891*
Cast iron pipe and fittings	1,192	2,269	9,451	10,376
Malleable iron screwed fittings	491	322	2,330	2,048
Carwheels and axles	285	1,292	12,122	3,630
Iron castings	499	591	6,234	5,217
Steel castings	209	173	1,837	1,406
Forgings	317	419	3,627	2,826
Castings and forgings	*2,993*	*5,066*	*35,601*	*25,503*
Total	247,312	243,300	2,140,048	1,729,667

Imports (In Gross Tons)

Articles	August 1935	August 1934	Eight Months Ended August 1935	Eight Months Ended August 1934
Pig iron	8,568	18,418	67,573	86,801
Sponge iron	151	1	817	744
Ferromanganese and spiegeleisen[1]	2,382	1,818	30,872	21,426
Ferrochrome[2]	....	2	1	67
Ferrosilicon[3]	50	20	606	597
Other ferroalloys[4]	....	....	1	46
Scrap	2,376	1,025	16,016	29,160
Pig iron, ferroalloys and scrap	*13,527*	*21,284*	*115,886*	*138,841*
Steel ingots, blooms, etc.	194	290	1,261	988
Wire rods	801	720	8,912	8,243
Semi-finished steel	*995*	*1,010*	*10,173*	*9,231*
Concrete reinforcement bars	481	142	2,010	960
Hollow bar and drill steel	110	....	683	466
Merchant and other steel bars	93	1,675	8,400	12,752
Bars whether solid or hollow[6]	2,329	....	7,186	....
Iron slabs	....	....	....	1
Iron bars	228	111	1,146	620
Boiler and other plate	141	54	387	182
Sheets, skelp, and saw plate	670	576	5,333	3,139
Tin plate	32	11	138	94
Structural shapes	4,521	2,480	25,124	14,400
Sheet piling	....	....	....	1,109
Rails and rail fastenings	458	225	2,921	2,105
Welded pipe	293	39	1,700	1,216
Other pipe	610	285	10,503	2,156
Cotton ties[5]	1,000	....	4,954	....
Other hoops and bands	1,079	2,323	13,443	11,821
Barbed wire	1,656	830	16,368	7,336
Round iron and steel wire	251	187	2,659	1,860
Telegraph and telephone wire	1	41	21	43
Flat wire and strip steel	249	245	1,117	1,080
Wire rope and strand	156	148	1,214	1,021
Other wire	127	71	751	588
Nails, tacks, and staples	2,112	428	12,445	5,129
Bolts, nuts, and rivets	1	19	227	186
Horse and mule shoes	64	10	445	278
Rolled and finished steel	*16,662*	*9,900*	*119,175*	*68,542*
Malleable iron pipe fittings	....	....	46	....
Cast iron pipe and fittings	....	29	27	40
Castings and forgings	128	195	790	1,061
Total	31,312	32,418	246,097	217,715

[1] Manganese content. [2] Chrome content. [3] Silicon content. [4] Alloy content. [5] New class. No comparable figures for 1934 or previous years. [6] New classification as result of the Reciprocal Trade Agreement wtih Belgium. No comparable figures for previous month or year.

WASHINGTON, Oct 1.—The 247,312 gross ton export trade of the United States in iron and steel products during August recorded a decline of 16.7 per cent from the July volume, and was chiefly guided downward by the 24-per cent decrease in shipments of iron and steel scrap.

Scrap recorded its second consecutive monthly decrease but continued in its rank as the leading product exported on a tonnage basis. Shipments of finished and semi-finished materials, however, maintained approximately the July level when they contributed to a substantial gain in the export volume for that month.

Exports over the elapsed eight-month period of this year show a gain of 24 per cent over shipments made during the corresponding period of last year.

The August import trade amounting to 31,312 tons fell off slightly from the July total, and, for the third consecutive month, continued to decrease. It also dropped 1106 tons under the July, 1934, figure. Receipts during the January-August, 1935, period at 246,097 tons registered a gain of 13.2 per cent over those received during the comparable period of last year.

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	August 1935	August 1934	Eight Months Ended August 1935	Eight Months Ended August 1934
United Kingdom	160	50	12,659	250
British India	4,504	5,135	19,256	25,215
Germany	225	....	375	....
Netherlands	126	11,751	19,167	52,953
Canada	2,953	....	9,005	4,664
France	....	....	50	....
Belgium	....	....	100	50
Norway	....	1,084	1,787	2,046
Sweden	100	300	647	565
Russia	500	....	3,673	....
All others	....	98	854	1,058
Total	8,568	18,418	67,573	86,801

September Pig Iron Output Up 4 Per Cent

PRODUCTION of coke pig iron in September totaled 1,772,856 gross tons against 1,761,286 tons in August. The September daily rate, at 59,095 tons, represented a gain of 4 per cent over the August average of 56,816 tons a day. With returns in from all active furnaces, there was a net gain of four furnaces, 103 being in blast on Oct. 1, against 99 (corrected) on Sept. 1.

(The usual tabulations and revised production figures will appear next week.)

$150,000 P.W.A. Loan for Rails

WASHINGTON, Oct. 1.—Application was made today to the Interstate Commerce Commission by the Gulf, Mobile and Northern Railroad for authority to negotiate a PWA loan of $300,000 of which approximately $150,000 would be used for the purchase of about 4030 tons of 90-lb. rails. Other expenditures would be made for accessories and other materials together with labor. The application outlined three programs covering estimated requirements for the remainder of 1935 and for 1936.

Carbon Steel Safety Factor Under Shock

WASHINGTON, Oct. 1. — A great many factors must be considered in selecting a steel for any given purpose, but so far as resistance to shock loads is concerned, carbon steel makes a better showing than some alloy steels, according to the experience of metallurgists at the Bureau of Standards, Department of Commerce.

Information on the relative resistance to shock loads of carbon steel and of an alloy steel proposed for the construction of large chains for lifting the gates of a dam in the Mississippi River was recently requested of the Bureau. The most convincing way of obtaining such information would be to subject chains of the two types of steel to shock loads and observe their behavior. Such tests were not practicable, however, since the chains were designed to have a lifting capacity of 1,000,000 lb.

It is known that carbon and some alloy steels, when fractured by a sudden application of load will, under certain conditions, show a fibrous fracture, whereas under other conditions the fracture will be granular and be produced by a considerably smaller shock load. The transition from fibrous to granular fracture may occur with a temperature drop of the order of 100 deg. to 0 deg. F. Other contributing factors are change in size, form, composition, and previous mechanical and thermal treatment. Some of these factors may cause the transition to occur at a higher temperature and some at a lower one. For a structure exposed to atmospheric ranges of temperature, the lower the temperature at which the transition from fibrous to granular fracture of the material occurs, the greater the margin of safety to be expected under shock loads.

Charpy impact tests made on notched-bar specimens of the steels under consideration for the chains at various temperatures ranging from —40 deg. to 212 deg. F., showed that the transition from fibrous to granular fracture occurred at an appreciably lower temperature in the carbon steel than in the alloy steel. Therefore, to the extent that the relative shock-resistance of the carbon steel and the tested alloy steel chains can be judged from the results, the tests indicated a greater margin of safety for the carbon steel.

Earnings Reach Two-Year High

AVERAGE hourly earnings were 60.1c. in August, or 0.5 per cent higher than in July, according to the National Industrial Conference Board's monthly survey of 25 manufacturing industries. This is the highest point reached since the upward movement in hourly wages began in the summer of 1933.

While usually there is little change in manufacturing activity in August as compared with July, in August of this year an accelerated pace was noted. Total man-hours worked were 3.1 per cent greater in August than in July. The improvement was fairly general. In 19 of the 25 industries reporting to the board, total man-hours worked in August were greater than in July. In some of the industries that showed declines in total man-hours worked the reduction was no greater than seasonal. The number of employees was 1.0 per cent higher and the combined payrolls were 3.4 per cent larger in August than in July.

The average work week rose from 36.4 hr. in July to 37.2 hr. in August, or 2.2 per cent. This increase in the number of hours worked, together with the increase in average houly earnings, raised average weekly earnings from $21.75 in July to $22.28 in August, or 2.4 per cent. An increase in the cost of living of 0.5 per cent from July to August, however, nullified part of the gain in actual weekly earnings; real weekly earnings were 1.9 per cent higher in August than in July.

New Welding Rod for Stainless Steel

THE Oxweld No. 28 Columbium treated 18-8 rod (patent applied for), recently brought out by the Linde Air Products Co., 30 East Forty-second Street, New York, for welding steels of the 18-8 type is said to simplify the fabrication of products of 18-8 stainless steel, and greatly improve the corrosion resistance of the fabricated joint areas.

Inclusion of a definite quantity of the element columbium is an outstanding feature. Because of this feature, products fabricated from "treated" or "stabilized" 18-8 steel by welding with this rod are said to have full corrosion and heat resistance in the as-welded condition. No heat treatment after welding is necessary. Use of this rod is said greatly to extend the possibilities for oxy-acetylene welding in the fabrication of 18-8 equipment to be used under corrosive or oxidizing conditions, particularly with fabricated articles subjected to high temperatures. No special technique other than that usually employed in welding stainless steel is required with this new welding rod.

Fabricated Plate Orders Up in August

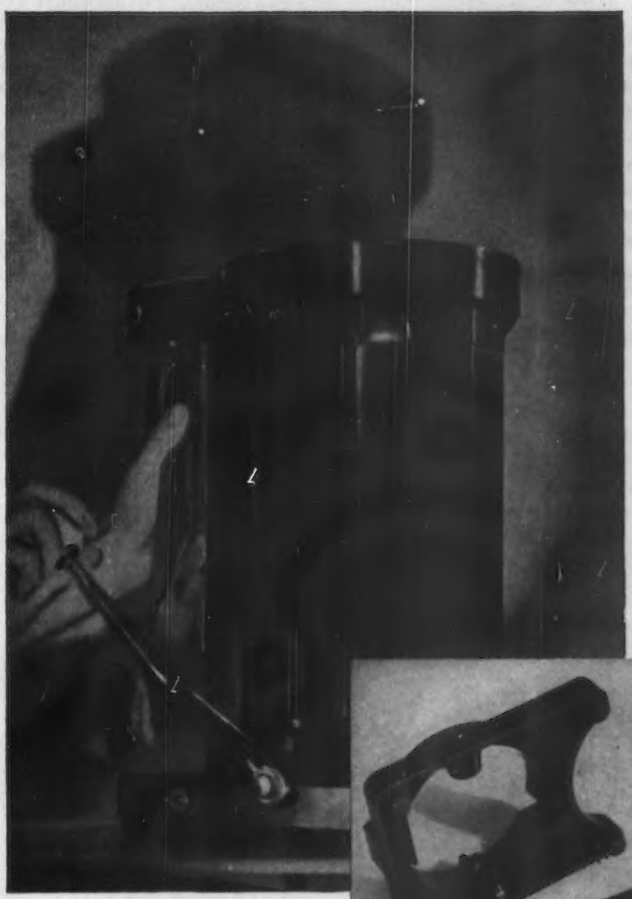
WASHINGTON, Oct. 1.—Orders for fabricated steel plate rose to 19,305 tons in August from 18,890 tons in July, according to the Bureau of the Census. The August orders were distributed as follows: Oil storage tanks, 3505 tons; refinery materials and equipment, 2599 tons; tank cars, 709 tons; gas holders, 331 tons; blast furnaces, 60 tons; miscellaneous, 11,901 tons.

In the eight-month period ended August of the present year, orders for fabricated steel plate totaled 137,657 tons, compared with 167,649 tons in the corresponding period of last year.

Entire housing

for largest, fastest mixer

MOLDED OF DUREZ



The new Andis Speedwhip does a thorough mixing job at the fountain in five or six seconds . . . ¼ the time of the average machine now in use. With such speed, made possible by the use of a ⅛ h. p. motor, the new Andis can take the place of a whole battery of ordinary mixers.
Mixing is done in a sealed chamber, with a double-blade agitator throwing the ingredients against a baffle. Ingredients are crushed between the revolving agitator and the baffle.

—comes out of molds complete with oil-less bearings, metal inserts and permanent finish.

The housing for the new Andis Speedwhip is one of the largest and most difficult molding jobs ever done. Sound design and engineering by American Record Corp. has made the molding of these large pieces practical. They chose uniform, dependable Durez for the job and produced the most attractive, durable, economical chassis and housing possible.

The entire housing is produced in three molds, complete with metal inserts for gears, switch and switch control arm. Oil-less bearings for the driving gears are molded right into the top section. No finishing is necessary . . . the smooth Durez surface needs no polishing or buffing after it comes from the mold—a saving in production operations which lowers the cost of the unit. Durez' structural strength stands up perfectly under the vibration of the powerful ⅛ h. p. motor. Its dielectric strength makes other insulation of the switches and motor unnecessary.

No matter what you make, you should be familiar with this modern, versatile material. Write (telling us what you make) for booklet "20 Applications" and suggestions on improving your product with Durez. General Plastics, Inc., 401 Walck Road, North Tonawanda, N. Y.

You can do it better with

DUREZ

The Modern Molding Compound

▲▲▲ Capital Goods Index Is

ACTIVITY in capital goods, as measured by THE IRON AGE index, held last week at 52.2 per cent of the 1925 to 1927 average, unchanged from the revised figure for the preceding period. Production of automobiles, as reported by Cram's showed an increase over the previous period for the first time in several weeks, indicating that a number of makers have completed preparations for new models and that 1936 cars will shortly appear in volume. Shipments of lumber, which two weeks ago advanced to a new high for the year, will not likely show any abatement in activity when figures for last week become available. At Pittsburgh, however, industrial production has eased off somewhat, and likewise steel ingot operating rates are lower. With renewed support from the automobile industry, however, both these components should gather momentum.

The combined index figure of 52.2 is the same as that for the first week in June of this year, 20 per cent above the corresponding period for 1934, and 7 per cent above that for 1933.

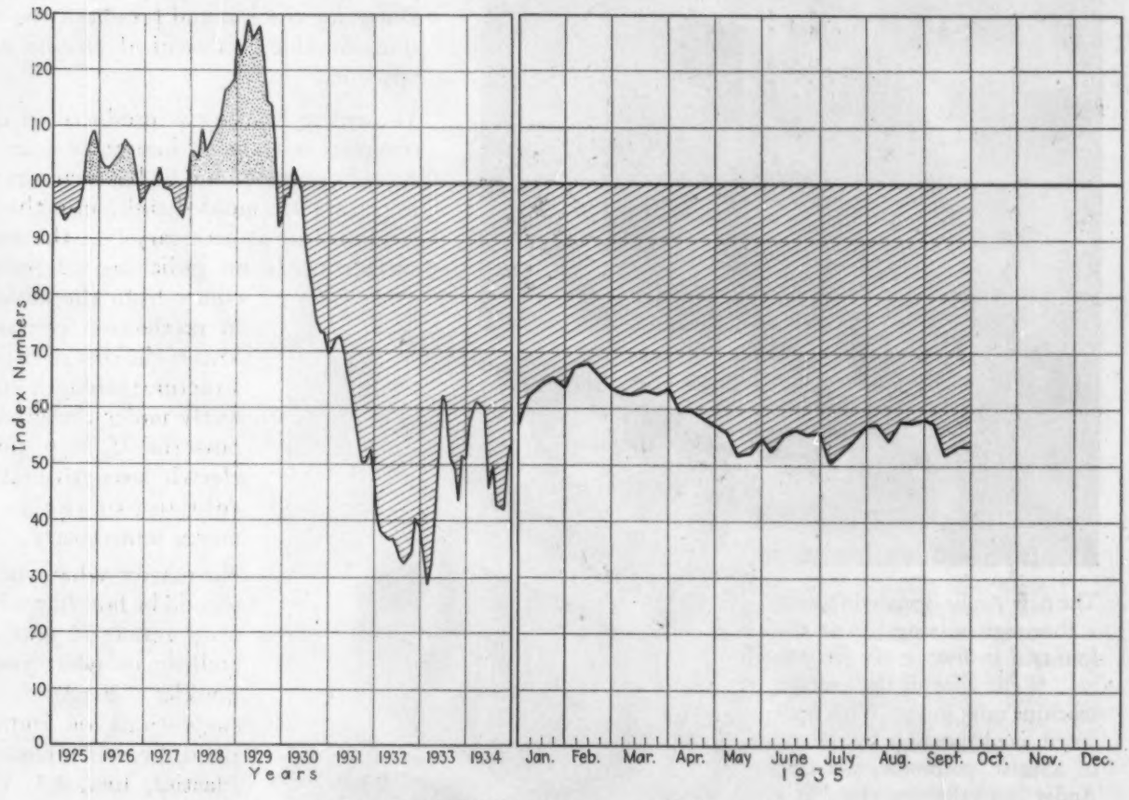
The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-'27 = 100)

Last week (est.)	52.2
Preceding week (rev.)	52.2
Same week last month	57.7
Same week 1934	43.6
Same week 1933	48.9
Same week 1932	33.5
Same week 1931	53.1
Same week 1930	78.3
Same week 1929	115.4

Locomotive Installations at Low Level

FURTHER evidence of the low volume of equipment purchasing by the railroads and of the con-



(1925-27 Average = 100)

The Iron Age Index of Capital Goods Activity. The years 1925 to 1934 are plotted by months, the current year by weeks.

Components of the index: Steel ingot production rate, from THE IRON AGE; revenue freight carloadings of forest products, from Association of American Railroads; automobile production, from Cram's Automotive Reports; heavy construction contract awards, from *Engineering News Record;* index of productive activity in Pittsburgh district, from Bureau of Business Research of University of Pittsburgh.

Is Unchanged ▲▲▲

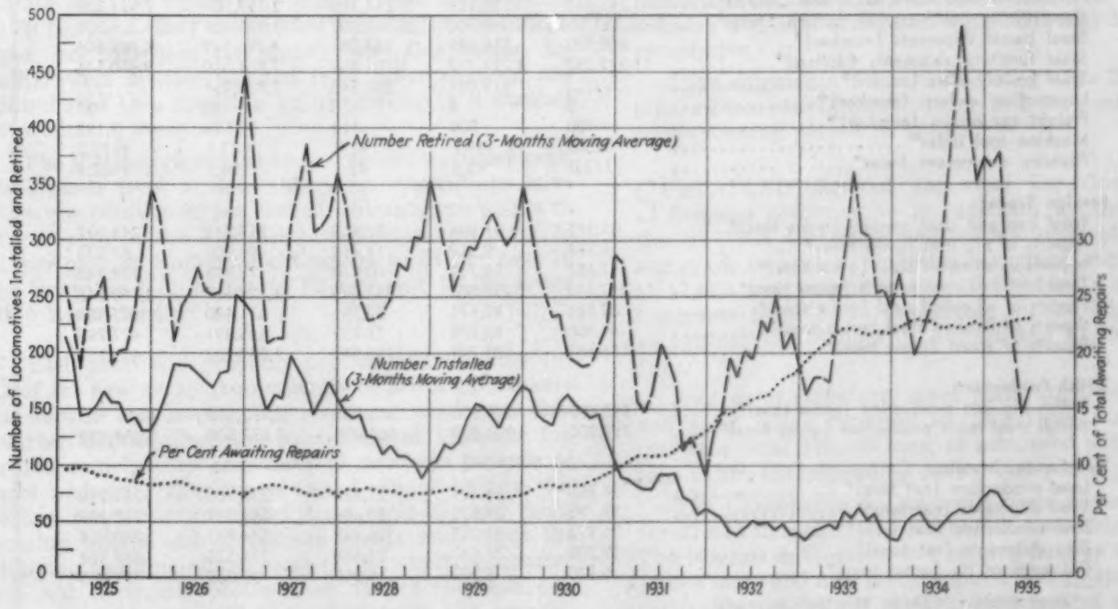
sequent condition of their rolling stock is revealed by the record of locomotive installations and retirements during the past decade. The chart at the bottom of the page shows the number of locomotives installed and the number retired by the railroads, and the per cent of the total number owned by the railroads that were awaiting repairs. All series have been plotted on a monthly basis since 1925, but the data on installations and retirements were "smoothed out" by the use of a three-months' moving average because of their erratic month-to-month fluctuations.

As in the case of other types of rolling stock, the number of locomotives retired during the prosperous years preceding the depression constantly exceeded the number of installations with the result that the number of locomotives owned by the railroads fell from a total of 64,823 at the beginning of 1925 to 56,819 by the end of 1929. Since the new locomotives installed were larger and more powerful than those retired, however, the tractive power of all locomotives declined to a much less extent during this five-year period. Thus the decline of 12.3 per cent in the number of locomotives in use was accompanied by a decrease of only 2.7 per cent in tractive power.

The immediate effect of the depression was to cause a sharp curtailment in both retirements and installations and an increase in the number of locomotives in need of repairs. Since 1931, the number of retirements has risen sharply, and, in 1934, 3955 locomotives were retired, a larger number than in any previous year. The number of new locomotives installed has continued at very low levels, though with some improvement during the past two years. In June of the current year 10,541 locomotives, or 23 per cent of the 45,910 owned by the railroads, were awaiting repairs.

As a result of the depression and because of their difficult financial position, the railroads are now ill-equipped to handle the substantial increase in traffic which may be expected with a revival of the heavy industries. As shown in the tabulation below, the available motive power of the roads, especially in view of the large number of locomotives awaiting repairs, appears to be far from adequate to meet the needs of even a partial restoration of pre-depression traffic volume.

	Number Awaiting Repairs	Number Owned	Tractive Power of Locomotives Owned Millions of Lbs.
1925	5,832	64,451	2,591
1926	4,964	63,266	2,601
1927	4,855	61,931	2,611
1928	4,522	60,095	2,591
1929	4,152	57,876	2,546
1930	4,515	56,380	2,535
1931	5,938	55,098	2,513
1932	8,233	53,572	2,467
1933	11,203	51,537	2,407
1934	10,803	49,211	2,334
1935	10,541	45,910	2,222



Locomotives: Installations, Retirements, and Per Cent Awaiting Repairs

Source: American Railway Association, Car Service Division: data obtained from **Survey of Current Business**

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available

	August, 1935	July, 1935	August, 1934	Eight Months, 1934	Eight Months, 1935
Raw Materials:					
Lake ore consumption (gross tons)[a]	2,615,927	2,198,189	1,443,943	16,766,927	19,155,629
Coke production (net tons)[b]	2,833,707	2,612,411	2,323,100	22,344,878	22,468,866
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	1,761,286	1,520,263	1,054,382	12,077,521	13,080,549
Pig iron output—daily (gross tons)[c]	56,816	49,041	34,012	49,702	53,829
Castings:					
Malleable castings—production (net tons)[d]	35,245	28,915	23,910	261,339	296,057
Malleable castings—orders (net tons)[d]	35,602	25,526	21,306	250,815	296,258
Steel castings—production (net tons)[d]	.....	31,125	43,748	339,401	.....
Steel castings—orders (net tons)[d]	.....	34,570	25,538	340,903	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	2,919,326	2,270,224	1,381,350	19,273,357	21,214,241
Steel ingot production—daily (gross tons)[e]	108,123	87,316	51,161	92,660	101,992
Steel ingot production—per cent of capacity[e]	48.84	39.44	23.24	42.08	46.07
Employment in Steel Industry:					
Total employees[e]	423,925	414,937	404,793	422,615	421,351
Total payrolls (thousands of dollars)[e]	$47,890	$42,725	$34,362	$327,676	$383,929
Average hours worked per week[e]	35.0	31.5	26.5	32.1	34.2
Finished Steel:					
Trackwork shipments (net tons)[e]	4,028	4,054	5,364	39,237	20,992
Sheet steel sales (net tons)[f]	207,140	206,313	66,064	1,324,225	1,558,438
Sheet steel production (net tons)[f]	206,613	145,505	77,197	1,411,714	1,578,009
Fabricated shape orders (net tons)[g]	86,047	62,239	95,489	765,934	666,193
Fabricated shape shipments (net tons)[g]	114,906	99,176	122,482	668,091	718,741
Fabricated plate orders (net tons)[g]	19,305	18,890	16,293	167,649	137,657
Reinforcing bar awards (net tons)[g]	101,140	7,645	27,315	150,730	221,540
U. S. Steel Corpn. shipments (tons)[h]	624,497	547,794	378,023	4,426,856	4,726,290
Ohio River steel shipments (net tons)[i]	92,501	77,464	45,840	442,277	578,613
Fabricated Products:					
Automobile production, U. S. and Canada[k]	247,743	350,113	244,715	2,317,109	2,971,328
Construction contracts, 37 Eastern States[l]	$168,557,200	$159,249,900	$119,591,800	$1,093,356,000	$1,024,313,900
Steel barrel shipments (number)[d]	600,993	555,649	364,081	4,798,839	4,189,606
Steel furniture shipments (dollars)[d]	1,327,252	1,224,722	1,101,469	7,801,619	9,450,546
Steel boiler orders (sq. ft.)[d]	.....	519,061	565,843	2,858,961	.....
Locomotive orders (number)[m]	0	5	5	88	21
Freight car orders (number)[m]	100	500	113	22,996	7,183
Machine tool index[n]	125.8	119.8	41.4	†37.1	†112.2
Foundry equipment index[o]	113.0	93.3	43.1	†54.7	†102.4
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	31,312	31,894	32,418	217,715	246,097
Imports of pig iron (gross tons)[p]	8,568	5,519	18,418	86,801	67,573
Imports of all rolled steel (gross tons)[p]	17,657	18,719	10,910	77,773	129,348
Total iron and steel exports (gross tons)[p]	247,312	296,802	243,300	1,729,667	2,140,048
Exports of all rolled steel (gross tons)[p]	82,866	83,171	82,381	651,680	577,704
Exports of finished steel (gross tons)[p]	64,400	68,129	72,132	565,891	497,988
Exports of scrap (gross tons)[p]	156,685	205,779	155,542	1,050,202	1,481,132
British Production:					
British pig iron production (gross tons)[r]	543,400	547,300	503,300	3,930,000	4,262,700
British steel ingot production (gross tons)[r]	759,900	803,300	667,000	5,892,500	6,364,400
Non-Ferrous Metals:					
Lead production (net tons)[s]	34,856	34,424	27,328	272,906	261,396
Lead shipments (net tons)[s]	38,195	34,575	33,606	241,529	268,189
Zinc production (net tons)[t]	35,922	35,055	26,169	234,933	280,964
Zinc shipments (net tons)[t]	39,200	32,241	21,663	238,525	286,524
Deliveries of tin (gross tons)[v]	5,320	5,290	4,045	30,065	39,000

*Preliminary. †Three Months' Average.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corpn.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; [l] F. W. Dodge Corpn.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

SUMMARY OF THIS WEEK'S BUSINESS

Pig Iron Production Gains 4 Per Cent in September

Ingot Output Rises One Point Over Last Week's Rate to 52½ Per Cent—Scrap Index Moves Up—Charcoal Iron Advances

PIG IRON production in September totaled 1,772,856 gross tons as compared with 1,761,286 tons in August. Output per day, at 59,095 tons, represented a gain of 4 per cent over the August daily rate of 56,816 tons. Furnaces in blast Oct. 1 numbered 103 against 99 on Sept. 1, a net gain of four.

THE trend of steel works operations has again turned upward. Following a recession of one-half point to 51½ per cent of capacity last week, ingot output has risen a point to 52½ per cent. Tardiness on the part of automobile interests in buying for new model production is still an adverse influence on operations in certain areas, as, for example, the Cleveland-Lorain district, where output has fallen seven points to 59 per cent. But automotive demand, in the aggregate, has increased moderately, and this factor, together with heavier demand from other sources, has contributed to a speeding up of activity in a number of producing centers.

The Pittsburgh rate is up two points to 46 per cent, its highest level to date this year. Operations have risen one point to 60 per cent at Chicago, two points to 40 per cent in the Philadelphia district, one point to 41 per cent at Buffalo, eight points to 54 per cent in the South and 11 points to 82 per cent in the lower Ohio River zone.

STEEL mills will probably not feel the full impetus of the new model requirements of motor car makers for another two weeks. The rise in demand from that quarter should offset any subsidence of bookings following anticipatory purchases of products because of price and extra changes on Oct. 1. Such buying was rather heavy in hot-rolled bars, cold-finished bars, forging billets and galvanized sheets and, since the shipping deadline at the close of the expiring quarter was not so rigidly observed as during the code era, mill schedules are still benefiting from the tonnage booked.

THE IRON AGE composite for finished steel, which had been unchanged at 2.124c. a lb. since July, 1934, has advanced to 2.130c. as a result of the $1 a ton rise in the base price of bars. The advance in the bar base, however, was accompanied by the establishment of deductions for quantity, so that for large buyers the market has actually declined. Steel prices, as a whole, are without evident trend. Primary materials, on the other hand, show growing strength.

AN advance in heavy melting steel at Pittsburgh has raised THE IRON AGE scrap composite from $12.75 to $12.83 a gross ton. By-product foundry coke has been marked up 50c. a ton at Cleveland and Chicago. Charcoal pig iron has gone up 50c. to $21.50, furnace. Coke pig iron prices remain unchanged, although the coal strike settlement, bringing with it a probable increase of 20c. a ton or more in coal prices, has increased the likelihood of an upward revision of quotations by blast furnace operators. Pig iron contracting has been heavy and some of it may have been speculative.

Lake shipments of ore until Oct. 1 were 22,104,213 tons, an increase of 3,079,629, or 16.1 per cent over the corresponding period in 1934.

SUSTAINED demand for steel for Government-financed construction is indicated by the completion of PWA allotments and the maturing of highway and grade separation projects. Structural steel awards, at 17,025 tons, compare with 19,900 tons a week ago. Contracts reported in September totaled 86,150 tons, as against 73,378 tons in August and 61,150 tons in July.

Awards of structural steel, plate work, reinforcing and sheet piling reported by THE IRON AGE to date this year total 949,266 tons, as compared with 909,787 tons in the corresponding period last year.

The Chesapeake & Ohio will place orders shortly for 21,842 tons of rails, on which it took bids Sept. 30. The Norfolk & Western will receive tenders Oct. 16 on 10,000 tons, and also plans to build 500 all-steel hopper car bodies, calling for close to 7000 tons of steel. The Gulf, Mobile & Northern has applied for authority to borrow funds for the purchase of 4030 tons of rails. The Wheeling & Lake Erie has closed for 2000 tons.

A 25-mile pipe line, on which the Los Angeles water district will take bids Oct. 24, calls for 16,000 to 23,000 tons of steel.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Oct. 1, 1935	Sept. 24, 1935	Sept. 4, 1935	Oct. 2, 1934
No. 2 fdy., Philadelphia	$20.3132	$20.3132	$20.3132	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	18.50
No. 2 Southern, Cin'ti	19.2007	19.2007	19.2007	19.13
No. 2, Birmingham†	14.50	14.50	14.50	14.50
No. 2 foundry, Chicago*	18.50	18.50	18.50	18.50
Basic, del'd eastern Pa	19.8132	19.8132	19.8132	19.76
Basic, Valley furnace	18.00	18.00	18.00	18.00
Malleable, Chicago*	18.50	18.50	18.50	18.50
Malleable, Valley	18.50	18.50	18.50	18.50
L. S. charcoal, Chicago	**24.7528**	24.2528	24.2528	24.04
Ferromanganese, seab'd carlots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	27.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	28.00
Slabs, Pittsburgh	27.00	27.00	27.00	27.00
Forging billets, Pittsburgh	35.00	35.00	35.00	32.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	**1.85**	1.80	1.80	1.80
Bars, Chicago	**1.90**	1.85	1.85	1.85
Bars, Cleveland	**1.90**	1.85	1.85	1.85
Bars, New York	**2.20**	2.15	2.15	2.13
Plates, Pittsburgh	1.80	1.80	1.80	1.80
Plates, Chicago	1.85	1.85	1.85	1.85
Plates, New York	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago	1.85	1.85	1.85	1.85
Structural shapes, New York	2.06¼	2.06¼	2.06¼	2.05¼
Cold-finished bars, Pittsburgh	1.95	1.95	1.95	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

Finished Steel

Per Lb.:	Oct. 1, 1935 Cents	Sept. 24, 1935 Cents	Sept. 4, 1935 Cents	Oct. 2, 1934 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh	2.40	2.40	2.40	2.60
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.65
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., Pittsburgh	2.80	2.80	2.80	3.00
Barbed wire, galv., Chicago dist. mill	2.85	2.85	2.85	3.05
Tin plate, 100 lb. box, P'gh.	$5.25	$5.25	$5.25	$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	**$13.50**	$13.25	$13.25	$10.25
Heavy melting steel, Phila	12.50	12.50	12.00	9.50
Heavy melting steel, Ch'go	12.50	12.50	12.50	8.75
Carwheels, Chicago	12.75	12.75	12.75	9.50
Carwheels, Philadelphia	11.75	11.75	11.75	11.25
No. 1 cast, Pittsburgh	14.25	14.25	14.25	11.25
No. 1 cast, Philadelphia	11.75	11.75	11.75	11.75
No. 1 cast, Ch'go (net ton)	11.25	11.25	11.00	8.00
No. 1 RR. wrot., Phila	12.25	12.25	12.25	11.25
No. 1 RR. wrot., Ch'go (net)	9.50	9.50	9.50	7.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.25	$3.85
Foundry coke, prompt	4.00	4.00	4.00	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	8.75	8.75	8.25	8.75
Lake copper, New York	9.12½	9.12½	8.62½	9.12½
Tin (Straits), New York	**50.15**	48.75	48.62½	50.95
Zinc, East St. Louis	4.75	4.75	4.60	3.90
Zinc, New York	5.12½	5.12½	4.97½	4.25
Lead, St. Louis	4.35	4.35	4.20	3.45
Lead, New York	4.50	4.50	4.35	3.60
Antimony (Asiatic), N. Y.	**14.25**	13.75	13.00	8.87½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Oct. 1, 1935	2.130c. a Lb.	$17.84 a Gross Ton	$12.83 a Gross Ton
One week ago	2.124c.	17.84	12.75
One month ago	2.124c.	17.84	12.58
One year ago	2.124c.	17.90	9.50

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1935	2.130c., Oct. 1	2.124c., Jan. 8	$17.90, Jan. 8	$17.83, May 14	$12.83, Oct. 1	$10.33, April 23
1934	2.199c., April 24	2.008c. Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Operations Are Up Two Points

Local Rate, at 46 Per Cent, Is Highest of Year—Heavy Melting Steel Scrap Advances 25c. a Ton

PITTSBURGH, Oct. 1.—Steel ingot output in the Pittsburgh district has risen two points to 46 per cent, representing the highest level reached this year. Schedules at the leading producers' mills have been stepped up slightly, while production at one small independent mill has expanded rather sharply following an influx of sizable automobile steel orders. Output in the Valleys and nearby northern Ohio mills is holding at 55 per cent. Production in the Wheeling district is steady at around 80 per cent, with one producer still operating at virtual capacity.

Increased production in the Pittsburgh area is due largely to scattered improvement in finished steel demand. Automotive steel orders are appearing in slightly heavier volume, particularly for strips. Structural steel inquiries have improved. Hot-rolled bars are moving rather briskly to some cold-finished steel producers, who placed specifications at the old base of 1.80c., Pittsburgh, for shipment during October. Similar protection has been given some cold-finished consumers who have ordered against the old card of extras for delivery at mill convenience in October. All new orders for steel items on which new extra lists became effective on Oct. 1 will be billed at the revised basis for fourth quarter delivery.

The shipping deadline at the close of the third quarter was not so rigidly observed as during the code era, and some mill schedules are now benefiting from the final spurt of specifications placed at the close of September.

Settlement of the bituminous coal strike, while foreshadowing additional cost burdens upon steel makers, has removed a threat to fourth quarter steel activity, which might otherwise have been seriously retarded. It is considered doubtful that the increased costs of fuel will be immediately reflected in finished steel or pig iron quotations.

The Pittsburgh scrap market has firmed, with No. 1 heavy melting steel 25c. a ton higher at $13.75 delivered.

Pig Iron

Although producers soon will be forced to pay higher prices for coke as a result of the new bituminous mine wage rates, it is not considered probable that pig iron quotations will be affected, at least for the time being. Demand in this district first would have to expand quite measurably beyond the present car-lot business before higher prices would stand a test. Furthermore, the pig iron market would have to regain a substantial part of the tonnage lost to cast scrap material, which still is available at more than $4 a ton less than pig iron. September volume exceeded August bookings by a fair margin, but furnaces have not been able to build up backlogs. Practically all business is for spot shipment, and contracting for fourth quarter is nil.

Semi-Finished Steel

The $2 a ton extra on billets from 6 in. x 6 in. down to 5 in. x 5 in. has become generally effective; also the new set-up covering the differentiation between carbon billets and forging bars. Comparatively little tonnage was placed in anticipation of the new price changes, and demand for semi-finished grades is therefore expected to continue on a fairly even keel in October. An increased demand for forging stock reflects a growing interest in automobile steel. Alloy billets also are moving in better volume. Sheet bar tonnage, largely for detached sheet producers, still is leading in the aggregate movement of semi-finished steel.

Bolts, Nuts and Rivets

Demand from the automotive industry is beginning to expand. Orders for railroad car construction also are being placed more frequently. A leading producer has received a contract for approximately 150 tons of bolts, nuts, tie-rods and miscellaneous bulkhead hardware for a harbor improvement project at Miami, Fla.

Rails and Track Accessories

The Chesapeake & Ohio Railroad yesterday closed bids on 636,000 tie plates and 5305 kegs of track spikes. The Norfolk & Western closes bids on Oct. 3 for its quarterly requirements, including 6000 kegs of track spikes. Other business in this market is largely for spot requirements.

Reinforcing Steel

About 400 tons is specified for an ammunition depot job in the Canal Zone. Lettings for road work are increasing sharply, with the heaviest awards in New York, Michigan, Pennsylvania, Indiana and the Carolinas. Private work, chiefly of small proportions, is showing an encouraging improvement. The change in the hot-rolled carbon bar price set-up has failed thus far to lead to revisions in methods of quoting reinforcing steel, and some doubt exists whether early adjustments will be made. Meanwhile, the distributers' price of 2.05c., Pittsburgh, which is being pared in many instances, will apply to fourth quarter delivery.

Cold-Finished Bars

Many consumers took advantage of the opportunity to order cold-finished carbon steel bars in September for shipment at mills' convenience in October on the basis of old size and quantity extras. All tonnage booked on and after Oct. 1 for fourth quarter delivery, however, will be billed in accordance with the new price card of extras. Heavy bookings in September have fattened backlogs in several instances, and operations of the cold-finished bar industry in October are expected to rise precipitately and may double the present rate of around 28 per cent. Strangely, the automotive industry generally ignored the chance to anticipate its requirements and faces the prospect of paying increased extras when it begins to order in a large way against its new model requirements.

Tubular Products

A moderate improvement is reported in bookings of mechanical tubing and boiler tubes. Demand for oil country goods has not been so brisk as it was several weeks ago. Standard pipe is moving faster, but line pipe remains a dead affair despite exploitation of one

or two large projects. Current quotations, which have been carried over from third quarter, are steady, but interest in extended shipments is at a minimum.

Bars

Volume is remarkably steady despite a lack of heavy automobile tonnage. No buying of significance for automotive consumption has appeared in this district, but bar producers are rather sanguine that such movement will necessarily start promptly. The base price for fourth quarter has been advanced $1 a ton to 1.85c. a lb., base, Pittsburgh, subject to the list of extras published in THE IRON AGE of Sept. 5. The base price will apply to shipment at one time of under 25 tons to 5 tons of one size, grade and for one destination.

Wire Products

The new method of quoting merchant trade wire products becomes generally effective today. Reductions have been in force since the new set-up was announced in August, and the advances provided for in the new schedule will apply to fourth quarter shipments. The volume of wire business from manufacturing sources is running well ahead of that from farm areas. The automotive industry, however, is not ordering as heavily as expected.

Plates and Shapes

A fair backlog of barge business is engaging barge yards at a fair rate and is accounting for a fairly steady call for fabricated plates. A small additional demand continues for repair work. Boiler work is slightly better, but tank construction is limited.

The list of structural inquiries reported here in the past week lengthened noticeably, with private work playing an important part. About 3000 tons will be purchased for a Chevrolet Motor Co. body plant at Indianapolis. A furnace building extension at Palmerton, Pa., for the New Jersey Zinc Co., will require 900 tons.

The Pittsburgh base for plates and structural shapes of 1.80c. a lb. applies to fourth quarter business, and is holding firmly. Fabricated material prices, however, are still subject to sharp concessions.

Sheets

Bookings in the final week of September indicated steady consumption among miscellaneous consumers and the automotive industry. Output for the sheet industry in the current week is expected to be sustained at 70 per cent of capacity. The shipping deadline at the end of the quarter is not being so rigidly observed, and some anticipatory tonnage in galvanized roofing, on which the $2 a ton jobbing allowance has been eliminated, probably will be rolled and shipped during the next ten days.

Tin Plate

While some small independent tin plate mills are operating on reduced schedules, relatively heavy operations at the leading producers' plants are still the dominant factor in maintaining a 55 per cent rate for the industry. The bulk of current shipments are for late vegetable packs. Lack of specifications in some directions foreshadows a fairly substantial carryover of stocks into next year.

Strip Steel

Increased orders from the automotive industry and sustained demand from miscellaneous quarters has pushed hot strip operations up moderately to 45 to 50 per cent. Seasonal upturns in some consuming lines this year are lacking. Additional expansion in automotive tonnage is looked for within the next two weeks, and mill rolling schedules are expected to be increased gradually during this month.

Coal and Coke

An average increase of 20c. a ton on bituminous coal is expected to be reflected in consumer prices as soon as producers have had an opportunity to analyze the effects on costs of the recent bituminous mine wage settlement. Connellsville beehive coke will be advanced proportionately. The probable results of the prospective increase in fuel prices will be to force liquidation of consumer stocks, which grew rapidly during the past several months, and an active market is not believed in the immediate offing.

Scrap

No. 1 heavy melting steel has moved 25c. a ton higher on round-lot purchases by a small independent mill at $13.75 delivered. Dealers are offering as high as $13.50 against No. 1 steel orders. Another mill last week on a conversion arrangement purchased 15,000 tons of No. 1 heavy melting steel at $14, delivered Pittsburgh district, representing virtually a trade for a similar quantity of scrap on the basis of $12.50 a ton at Cleveland. The material at Cleveland is being furnished from a plant being dismantled and from which also about 15,000 tons of heavy breakable cast will be shipped to Mansfield, Ohio, and Duluth. In view of the special features of the transaction, the price paid at Pittsburgh is not considered directly representative of the open market. The scrap market at Pittsburgh is fairly buoyant, and rising ingot operations this week portend an even firmer tone. The Pennsylvania Railroad list, closing Oct. 2, covers about 24,000 tons, of which 10,650 tons is No. 1 heavy melting steel. Of 7900 tons on the Baltimore & Ohio list, closing Oct. 9, 1500 tons is No. 1 steel.

Weekly Indications of Steel Activity

From THE IRON AGE

	Oct. 1, 1935	Sept. 24, 1935	Sept. 4, 1935	Oct. 2, 1934	Average Year to Date 1935	1934
Steel ingot operations—Per cent of capacity	52.5	51.5	50.5	24.0	46.4	39.7

	Week Ended Oct. 1, 1935	Sept. 24, 1935	Sept. 4, 1935	Oct. 2, 1934	Year to Date 1935	1934
Fabricated structural steel awards	17,025	19,400	8,825	15,850	540,330	606,450
Fabricated plate awards	4,200	3,860	12,200	4,600	111,987	100,042
Sheet steel piling awards	3,750	125	2,550	250	47,990	43,050
Reinforcing bar awards	5,250	12,840	87,550	2,250	248,950	160,245

Chicago Output Rebounds To 60 Per Cent

Charcoal Pig Iron and Chicago Foundry Coke Advanced 50c. a Ton—Scrap Is Quiet But Has Firm Tone

CHICAGO, Oct. 1.—Ingot output has regained the one point loss of last week and again stands at 60 per cent of capacity. This favorable change, while not large, seems to be significant because it gives the first inkling that the automobile industry is moving away from the more or less dead center on which it has been hanging for the past few weeks.

All major consuming lines are holding recent gains, and it remains only for automobile demand and a start on the extensive overhead crossing programs to push steel output to a higher level. Prospects in the oil fields are improved and a number of developments in that direction are already under way.

Sales and specifications for finished steel are above the average for the year to date and stand very close to the average of the past 10 weeks.

Price changes are confined to announcements of a 50c. advance on charcoal iron and a like amount on foundry coke. Melters are giving close attention to the pig iron market for they are under the impression that the move in charcoal iron may soon spread to other grades.

Prices for scrap are at a dead level and railroad offerings are quickly taken up at prices that contradict the suggestion that crops out here and there that weakness is beginning to show.

Pig Iron

Charcoal iron is being marked up 50c. a ton to $21.50 a ton at the furnaces or $24.75 a ton, delivered Chicago. Prices for Northern coke iron are very strong. September sales of Northern iron were the largest in three years and they exceeded March of this year by 150 per cent. Fourth quarter books are well filled, but new business keeps coming in and sellers are beginning to frame ideas as to the extent of speculative buying. September shipments topped the August volume by 40 per cent.

Rails

The next big event in this market will be award of the Chesapeake & Ohio rails. Western producers expect to participate in the order, announcement of which is looked for any day. There is as yet no definite word as to the rails that will be needed for the Santa Fe improvement program. In the meantime a few small orders have reached mills, which are now scheduled at the current low rate until about the end of October. The light rail market is dormant.

Plates

Word from oil producing centers is distinctly encouraging. A 140-mile pipe line is contemplated to Toledo, and construction has started on a 3000-bbl. refinery at Alma, Mich. A 1200-bbl. topping unit is also to go in in Michigan. Bids are to be taken on locks on the Illinois River at Peoria, Ill. No mention is made of gates, which will come at a later date and will take a tonnage of plates. Railroad shops are slightly busier and there continues to be pressure against railroads for certain types of equipment.

Bars

Shipments to automobile plants and parts makers are moderately heavier, but it is clear that movement of steel for new models is not yet in swing. Sellers are more and more appreciative of the support given to the market by miscellaneous users. Their individual wants are small and have not tended to grow materially, but the aggregate volume is a surprise to the steel industry. Agricultural implement manufacturers are turning out a large volume of equipment and they have not modified in any way their optimistic view of the coming year.

Structural Material

Awards total 6000 tons, which include 2200 tons for a Meredosia, Ill., bridge taken by the American Bridge Co. All other lettings are small, ranging from 100 tons to 900 tons, and they are widely scattered over the territory west of the Mississippi River. State highway bridge work is prominent in the inquiry list, which totals 12,000 tons. The largest item is 3000 tons for a Chevrolet plant at Indianapolis, Ind. Both inquiries and awards in Chicago and the immediate vicinity are very light.

Wire Products

Output has climbed to 55 per cent of capacity under the leadership of demand for manufacturers' wire. In this upward movement automobile manufacturers are playing the major role, and yet they have not by any means reached the height of use which is to be expected when assembly lines are on regular schedules. Jobbers are ordering in limited quantities and it is evident that they are attempting to hold stocks at a low point. Their fall buying movement, which usually gives such excellent support to the wire trade at this time of year, has not materialized.

Scrap

This market is listless, but the degree of firmness of prices is shown by the bidding for railroad offerings. Railroads can still command $12.60 to $12.90 a gross ton delivered for heavy melting steel. Incoming shipments are in good volume and easily satisfy mill quotas, which are being firmly held. Most foundries are insisting on deliveries of less than two weeks. The end of navigation on the Great Lakes is near at hand and the trade looks for a heavy boat shipment of borings and busheling from Chicago docks to Lake Erie ports. Railroad offerings this week are 1500 tons advertised by the Alton, 8000 tons by the Rock Island and 3300 tons by the Chicago & North Western.

Reinforcing Bars

Two sizable developments are shaping at Milwaukee. One of these, a Federal housing project, calls for 1300 tons, and the other, the second section of the Milwaukee filter plant, will take 1800 tons. About 550 tons has been placed for Mississippi River locks in Missouri. From all indications, the mainstay of the reinforcing bar market should be the overhead crossing programs in Illinois and adjoining States. But, whether for political or other reasons, all of those projects are ethereal to the point where fabricators know only that the jobs

are still contemplated. Jobbers' prices remain variable.

Cast Iron Pipe

Demand is very slow in and near Chicago, but a ray of light is showing in Ohio, where some of the WPA jobs are getting under way. So far, however, they are all small, ranging from one to three cars each. Milwaukee is soon to take bids on the second section of its filter plant, for which some tonnage, largely specials, will be needed. Private buying is lacking and all signs point to Government spending for such support as this market will get throughout the remainder of the year.

Coke

Foundry coke prices for October deliveries are being advanced 50c. a ton to $9, ovens, for delivery outside the switching district. September shipments showed marked improvement over the preceding month.

Carnegie-Illinois Announces Personnel

PRODUCTION and sales of Carnegie Steel Co., Illinois Steel Co. and Lorain Steel Co., subsidiaries of the United States Steel Corpn., were unified into the Carnegie-Illinois Steel Corpn., headed by Benjamin F. Fairless as president, on Oct. 1. I. Lamont Hughes, formerly president, Carnegie Steel Co., has been appointed executive vice-president of the new corporation.

Other officers selected for the Carnegie-Illinois organization are Clement V. McKaig, vice-president and general manager of sales, and J. E. Lose, vice-president in charge of operations. All of these executives will maintain offices both in Pittsburgh and Chicago.

G. Cook Kimball will serve as vice-president and chief executive of the Chicago district, and William I. Howland, Jr., vice-president in charge of Western sales, both with offices at Chicago. L. H. Burnett, formerly head of Carnegie Steel Co.'s legal staff, will be vice-president, with offices at Pittsburgh, and Carroll Burton, formerly president, Lorain Steel Co., Johnstown, Pa., will be vice-president in charge of the Lorain division.

As announced elsewhere, J. W. Hamilton has been elected secretary; William Donald, auditor, and H. E. Jeffries, treasurer. The Illinois division of the Carnegie-Illinois Steel Corpn. will maintain administrative, sales, operating and financial headquarters at 208 South LaSalle Street, Chicago. Purchasing departments will be maintained in both the Pittsburgh and Chicago districts.

Navy Department Order—Six Submarines

THE Navy Department on Sept. 28 placed contracts for the building of submarines Nos. 182 to 187. Two of these submarines will be constructed at the United States Navy Yard at Portsmouth, Me., and one at the Mare Island, Cal., Navy Yard. The other three will be built at the shipyards of the Electric Boat Co., Groton, Conn.

Machinery contracts, including the Diesel engines and electrical equipment for the six vessels have been placed with two companies. The Winton Engine Corpn., Cleveland, will furnish the machinery for three submarines and the Hooven-Owen-Renschler Co., Hamilton, Ohio, will furnish the equipment for three submarines.

The electrical equipment for all six submarines will be built by the Elliott Co., Pittsburgh, at its works in Ridgway, Pa. The total contract with the Winton Engine Co. is $2,288,145 and the contract with Hooven-Owen-Renschler is $2,447,232. The Elliott Co.'s share in both contracts is considerably over $1,000,000.

Gear Makers' Meeting Program Completed

A COMPREHENSIVE program of papers and addresses dealing with problems of gear manufacture has been arranged for the semi-annual meeting of the American Gear Manufacturers Association, to be held at the General Brock Hotel, Niagara Falls, Canada, Oct. 14-15. Subjects and speakers include:

"Gear Tooth Wear or the Strength of Gears from the Transmission Standpoint," by J. O. Almen, head of research division, General Motors Corpn.; "Metallurgical Analysis of Gear Failures as Seen Through the Microscope," by John T. Howat, chief metallurgist, Pittsburgh Steel Foundry Corpn.; "Gear Lubrication," by T. C. Dick, Texas Co.; and "Speed Increasing Gears and Gear Units and Their Technical Differences from Reducing Gears and Gear Units," by P. C. Day, Falk Corpn.

Also, "Practical Treatment of Industrial Relations Problems," by Louis Ruthenburg, president, Servel, Inc.; "Educating Shop and Office Employees in Their Duties," by H. H. Kerr, president, Boston Gear Works, Inc.; "Trade Association Objectives, Policies and Activities," by W. J. Donald, managing director of N.E.M.A.; "An Analysis of Our Cost Accounting Manual," by H. N. Mathias, auditor, Westinghouse Electric & Mfg. Co.

A. A. Ross, engineer, General Electric Co., West Lynn, Mass., is president and J. C. McQuiston, Wilkinsburg, Pa., is secretary of the association.

Granite City Company Places Mill Order

ST. LOUIS, Oct. 1.—Granite City Steel Co. has awarded a contract for a 90-in. four-high hot strip mill and a 42-in. four-high reversing cold mill, with complementary equipment, to United Engineering & Foundry Co., Pittsburgh. Work is to start immediately.

Hayward Niedringhaus, president of the steel company, said the mills will be able to produce plates up to 84 in. wide, hot strips in sheet or coil up to 72 in. wide, and cold strip up to 36 in.

The mills are a part of the company's $4,000,000 expansion program, with funds provided by approximately $2,000,000 in surplus treasury money and a little more than $2,000,000 realized from stock offering to present holders.

Milling Cutters and Other Tools.—Ingersoll Milling Machine Co., Rockford, Ill. Comprehensive 50-page booklet, No. 51, featuring the company's Zee Lock cutter blade, showing design details and application to various types of milling cutters. Cone type face mills and helical milling cutters, as well as a variety of special cutters, are also described and illustrated. A section covers multi-blade cutter tool application, design and use, and jigs and fixtures, including the unit type, are among other items shows.

Acme Equipment Co., Michigan representative for Kroeschell Boiler Co., of Racine, Wis., has just sold to the Pfeiffer Brewery, 502-hp., four-drum, bent tube, water tube boiler, which is to be equipped with Fire-Rite stokers. Boiler and stoker will increase capacity of Pfeiffer Brewery power plant.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Gary	1.90c.
F.o.b. Duluth	2.00c.
Del'd Detroit	2.00c.
F.o.b. Cleveland	1.90c.
F.o.b. Buffalo	1.95c.
Del'd Philadelphia	2.16c.
Del'd New York	2.20c.
F.o.b. Birmingham	2.00c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars Pacific ports	2.40c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	1.95c.
F.o.b. Chicago	2.00c.
F.o.b. Gary	2.00c.
F.o.b. Cleveland	2.00c.
F.o.b. Buffalo	2.05c.
Del'd Detroit	2.15c.
Del'd eastern Michigan	2.20c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts	*Base per Net Ton*
F.o.b. Pittsburgh	$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston, Orange, Beaumont, Galveston	59.00
F.o.b. Mobile	58.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	59.00
F.o.b. cars dock Pacific ports	63.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.99c.
Del'd New York	2.09c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.015c.
Del'd New York	2.0625c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.16c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. cars dock Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.71c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. cars dock Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10, gage, del'd Phila.	2.81c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila	3.26c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 f.o.b. cars dock Pacific ports	3.50c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.41c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. cars dock Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. Gary	3.50c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Gary	3.20c.
No. 20, f.o.b. Birmingham	3.70c.
No. 20, f.o.b. cars dock Pacific ports	3.70c.
No. 10, f.o.b. Pittsburgh	2.50c.
No. 10, f.o.b. Gary	2.60c.
No. 10, f.o.b. Birmingham	3.10c.
No. 10, f.o.b. cars dock Pacific ports	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific Coast ports	3.35c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ in.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips

	Base per Lb.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade	*Per Lb.*
Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $3 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To Larger Lot Buyers	*Base per keg*
Standard wire nails	$2.40
Smooth coated nails	2.40

Base per 100 Lb.	
Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.10
Galvanized staples	3.35
Barbed Wire, galvanized	2.80
Twisted barbless wire	2.80
Woven wire fence, base column	58.00
Single loop bale ties, base column	53.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth, which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh, while Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

On staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

Of List	
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Black	Galv.	*Wrought Iron* Inches	Black	Galv.
⅛	+51½	+29½	⅛	+91½	+138
¼ to ⅜	+53½	+35	¼ & ⅜	+1½	+21½
½	+58½	+47	½	+31½	+15
¾	+62	+52	¾	+36½	+20½
1 to 3	+64	+55	1 & 1¼	+39½	+25½
			1½	+43½	+28
			2	+41½	+26

Lap Weld

2	+60	+51	2	+37	+22½
2½ to 3	+63	+54	2½ to 3½	+38	+25
3½ to 6	+65	+56	4 to 8	+40	+28½
7 and 8	+64	+54	9 to 12	+38	+24½
9 and 10	+63½	+53½			
11 and 12	+62½	+52½			

Butt Weld, extra strong, plain ends

⅛	+48½	+32½	⅛	+12	+45½
¼ to ⅜	+51	+38	¼ & ⅜	+2½	+34½
½	+56½	+47½	½	+32½	+17½
¾	+61	+52	¾	+37½	+22½
1 to 3	+63	+55	1 to 2	+43½	+29

Lap Weld, extra strong, plain ends

2	+58	+50	2	+40	+26
2½ to 3	+62	+54	2½ to 4	+45½	+33
3½ to 6	+65½	+57½	4½ to 6	+45	+33½
7 and 8	+64½	+54½	7 & 8	+46	+33
9 and 10	+63½	+53½	9 to 12	+41½	+30
11 and 12	+62½	+52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.31	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2¾ in. o.d.	12 B.W.G.	19.29	17.54
2½ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
8 in. o.d.	7 B.W.G.	79.15	71.90

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½ %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

Lapweld Steel and Knobbled Charcoal Iron Pressure Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Steel	*Iron*
1½ in. o.d.	13 B.W.G.	$ 9.72	$20.16
1¾ in. o.d.	13 B.W.G.	11.06	21.84
2 in. o.d.	13 B.W.G.	12.38	17.23
2¼ in. o.d.	13 B.W.G.	13.79	19.58
2½ in. o.d.	12 B.W.G.	16.58	24.19
2¾ in. o.d.	12 W.B.G.	17.54	26.40
3 in. o.d.	12 B.W.G.	19.35	28.39
3½ in. o.d.	11 B.W.G.	21.56	33.95
3½ in. o.d.	11 B.W.G.	23.15	36.16
4 in. o.d.	10 B.W.G.	28.66	45.36
4½ in. o.d.	10 B.W.G.	35.22	50.48
5 in. o.d.	9 B.W.G.	44.25	61.86
6 in. o.d.	7 B.W.G.	68.14	102.46

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5%
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25%
Under 2,000 lb. or ft.	plus 40%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$48.40
*4-in., del'd Chicago	51.40
6-in. and larger, del'd New York	45.20
4-in., del'd New York	48.20
*6-in. and larger, Birmingham	40.00
*4-in. Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
4-in., f.o.b. dock, San Francisco or Los Angeles	51.00
F.o.b. dock, Seattle	51.50

Class "A" and gas pipe, $3 extra.

*Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39, Birmingham, and $47.40, delivered Chicago, and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

Base per 100 Lb.	
Spikes, 9/16 in. and larger	$2.40
Spikes, ⅜ and smaller	2.40
Tie plates, steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	3.55
Track bo'ts, no jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	75
Carriage bolts	75
Lag bolts	75
Plow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagon	75
C.p.c. and t. square or hex. nuts, blank or tapped	75
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl. 1 in. diameter	75
Larger than 1 in. diameter	75
Stove bolts in packages, Pittsburgh	75
Stove bolts in packages, Chicago	75
Stove bolts in packages, Cleveland	75
Stove bolts in bulk, Pittsburgh	83
Stove bolts in bulk, Chicago	83
Stove bolts in bulk, Cleveland	83
Tire bolts	60

Large Rivets
(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets
(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ⅝ in. and smaller	75
Upset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. dia and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, Uncropped ..... $40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is $52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base ..... 2.45c.
Delivered price at Detroit is ..... 2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1¼% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% NI. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Rerolling slabs	15c.
Bars	23c.
Plates	26c.
Structural shapes	22c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped ..... $29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped ..... $31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

	Per Gross Ton
Rerolling	$27.00
Forging quality	35.00

Delivered Detroit

Rerolling	$30.00
Forging	38.00

Billets Only F.o.b. Duluth

Rerolling	$29.00
Forging	37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Wire Rods
(Common, base)

	Per Gross Ton
F.o.b. Pittsburgh	$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00
F.o.b. Galveston	44.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	....	....	19.00	....
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	20.75
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn From East. Pa.	21.9289	22.4289	21.9289	22.9289
Newark or Jersey City, N. J. From East. Pa.	20.9873	21.4873	20.4873	21.9873
Philadelphia From Eastern Pa.	20.3132	20.8132	19.8132	21.3132
Cincinnati From Hamilton, Ohio	19.5807	19.5807	19.0807	20.0807
Canton, Ohio From Cleveland and Youngstown	19.3402	19.8402	19.3402	20.3402
Columbus, Ohio From Hamilton, Ohio	20.64	20.64	....	....
Mansfield, Ohio From Cleveland and Toledo	20.3832	20.3832	....	....
Indianapolis From Hamilton, Ohio	20.9289	20.9289	....	....
South Bend, Ind. From Chicago	20.6935	20.6935	....	....
Milwaukee From Chicago	19.57	19.57	....	....
St. Paul From Duluth	20.94	....	....	....
Davenport, Iowa From Chicago	20.3832	20.3832	....	....
Kansas City From Granite City	21.2178	21.2178	....	....
San Francisco, Los Angeles or Seattle. From Provo	22.315	....	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $23.50

GRAY FORGE PIG IRON

Valley furnace	$18.00
Pittsburgh district furnace	18.00

CHARCOAL PIG IRON

Lake Superior furnace	$21.50
Delivered Chicago	24.7528
Delivered Buffalo	25.095

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

	Per Gross Ton
Domestic, 80% (carload)	$85.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

		Per Gross Ton Delivered
50%	(carloads)	$77.50
50%	(ton lots)	85.00
75%	(carloads)	126.00
75%	(ton lots)	136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carloads	$1.35 to $1.45
Ferrotungsten, less carloads	1.45 to 1.55
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C. f.o.b. furnace carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered, 2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.25 to $13.75
No. 2 heavy melting steel	12.00 to 12.50
No. 3 railroad wrought	13.50 to 14.00
Scrap rails	14.25 to 14.75
Rails, 3 ft. and under	15.50 to 16.00
Compressed sheet steel	13.25 to 13.75
Hand bundled sheet steel	12.00 to 12.50
Hvy. steel axle turnings	11.50 to 12.00
Machine shop turnings	9.50 to 10.00
Short shov. turnings	9.50 to 10.00
Short mixed borings and turnings	7.00 to 7.50
Cast iron borings	7.00 to 7.50
Cast iron carwheels	14.00 to 14.50
Heavy breakable cast	12.25 to 12.75
No. 1 cast	14.00 to 14.50
Railr. knuckles and couplers	15.00 to 15.50
Rail. coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
Low. phos. billet crops	16.50 to 17.00
Low phos. sheet bar crops	15.50 to 16.00
Los phos. punchings	15.00 to 15.50
Low phos. plate scrap	14.50 to 15.00
Steel car axles	14.50 to 15.00

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$12.25 to $12.75
Automobile hvy. melt. steel	11.25 to 11.75
Shoveling steel	12.25 to 12.75
Hydraulic comp. sheets	11.25 to 11.75
Drop forge flashings	9.50 to 10.00
No. 1 busheling	11.00 to 11.50
Rolled carwheels	12.75 to 13.25
Railroad tires	13.00 to 13.50
Railroad leaf springs	12.75 to 13.25
Axle turnings	11.00 to 11.50
Steel couplers and knuckles	13.25 to 13.75
Coil springs	14.25 to 14.75
Axle turnings (elec. fur.)	11.75 to 12.25
Low phos. punchings	14.50 to 15.00
Low phos. plates, 12 in. and under	14.50 to 15.00
Cast iron borings	6.00 to 6.50
Short shoveling turnings	7.50 to 8.00
Machine shop turnings	7.00 to 7.50
Rerolling rails	13.50 to 14.00
Steel rails, less than 3 ft.	13.50 to 14.00
Steel rails, less than 2 ft.	15.00 to 15.50
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	12.75 to 13.25
Railroad malleable	14.75 to 15.25
Agricultural malleable	10.25 to 10.75

	Per Net Ton
Iron car axles	$15.50 to $16.00
Steel car axles	14.75 to 15.25
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Locomotive tires, smooth	11.50 to 12.00
Pipes and flues	7.00 to 7.50
No. 1 machinery cast	11.25 to 11.75
Clean automobile cast	10.50 to 11.00
No. 1 railroad cast	9.75 to 10.25
No. 1 agricultural cast	10.00 to 10.50
Stove plate	8.00 to 8.50
Grate bars	8.00 to 8.50
Brake shoes	8.00 to 8.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$12.50
No. 2 heavy melting steel	$11.25 to 11.50
Hydraulic compressed, new	10.00 to 10.50
Hydraulic compressed, old	8.50 to 9.00
Steel rails for rolling	14.00 to 14.50
Cast iron carwheels	11.50 to 12.00
Heavy breakable cast	11.00 to 11.50
No. 1 cast	11.50 to 12.00
Stove plate (steel works)	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
No. 1 blast furnace	5.00 to 5.00
Heavy axle turnings	9.50 to 10.00
Cast borings	5.00 to 5.50
No. 1 low phos. heavy	14.50 to 15.00
Couplers and knuckles	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Steel axles	16.00
Shafting	17.50 to 18.00
No. 1 railroad wrought	12.00 to 12.50
Spec. iron and steel pipe	9.50 to 10.00
Bundled sheets	9.50 to 10.00
No. 1 forge fire	9.50 to 10.00
Cast borings (chem.)	10.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	8.00 to 8.50
Scrap rails for melting	9.25 to 9.75
Loose sheet clippings	6.00 to 6.50
Bundled sheets	7.25 to 7.75
Cast iron borings	5.50 to 6.00
Machine shop turnings	5.75 to 6.25
No. 1 busheling	7.25 to 7.75
No. 2 busheling	3.75 to 4.25
Rails for rolling	10.25 to 10.75
No. 1 locomotive tires	8.50 to 9.00
Short rails	13.00 to 13.50
Cast iron carwheels	9.50 to 10.00
No. 1 machinery cast	10.50 to 11.00
No. 1 railroad cast	9.75 to 10.25
Burnt cast	7.25 to 7.75
Stove plate	7.25 to 7.75
Agricultural malleable	9.25 to 9.75
Railroad malleable	10.50 to 11.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$13.25 to $12.50
No. 2 heavy melting steel	11.25 to 11.50
Compressed sheet steel	11.00 to 11.50
Light bundled sheet stampings	9.25 to 9.75
Drop forge flashings	10.50 to 11.00
Machine shop turnings	7.75 to 8.25
Short shoveling turnings	8.00 to 8.50
No. 1 busheling	10.50 to 11.00
Steel axle turnings	10.50 to 11.00
Low phos. billet crops	15.00 to 15.50
Cast iron borings	7.75 to 8.25
Mixed borings and short turnings	7.75 to 8.25
No. 2 busheling	7.75 to 8.25
No. 1 cast	13.50 to 14.00
Railroad grate bars	7.00 to 7.50
Stove plate	7.50 to 8.00
Rails under 3 ft.	13.00 to 13.50
Rails for rolling	15.50 to 16.00
Railroad malleable	15.50 to 16.00
Cast iron carwheels	10.75 to 11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$12.00 to $12.50
No. 2 heavy melting scrap	11.00 to 11.50
Scrap rails	12.00 to 12.50
New hydraul. comp. sheets	11.00 to 11.50
Old hydraul. comp. sheets	9.50 to 10.00
Drop forge flashings	10.50 to 11.00
No. 1 busheling	11.00 to 11.50
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	5.50 to 6.00
Knuckles and couplers	13.00 to 14.00
Coil and leaf springs	13.00 to 14.00
Rolled steel wheels	13.00 to 14.00
Low phos. billet crops	14.50 to 15.00
Short shov. steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
No. 2 busheling	7.00 to 7.50
Steel car axles	12.50 to 13.00
Iron axles	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 cupola cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Steel rails, 3 ft. and under	14.50 to 15.00
Cast iron carwheels	12.00 to 12.50
Railroad malleable	14.00 to 14.50
Chemical borings	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	$9.00 to $9.25
No. 1 heavy melting steel	7.40 to 7.90
*Scrap rails	9.25 to 9.50
Scrap rails	7.50 to 8.00
*No. 2 steel	8.00 to 8.25
No. 2 steel	6.40 to 6.90
Breakable cast	6.00 to 6.25
Machine shop turnings	.... 3.65
Bundled skeleton, long	.... 6.15
Forge flashings	.... 6.15
Shafting	13.00 to 13.25
Steel car axles	12.50 to 13.00
Cast iron borings, chemical	5.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	$9.50 to $10.00
No. 1 machinery cast	9.50 to 10.00
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.50 to $8.75*
No. 2 heavy melting steel	7.50 to 7.75*
Heavy breakable cast	6.75 to 7.25
No. 1 machinery cast	7.00 to 7.50
No. 2 cast	.... 6.50
Stove plate	.... 6.50
Steel car axles	13.50 to 14.00
Shafting	13.50 to 13.75
No. 1 railroad wrought	7.75 to 8.25
No. 1 yard wrought, long	6.75 to 7.25
Spec. iron and steel pipe	5.50 to 6.00
Forge fire	6.50 to 7.00
Rails for rolling	9.00 to 10.00
Short shoveling turnings	3.00 to 3.25
Machine shop turnings	3.50 to 4.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	4.50 to 5.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	.... $10.50
No. 1 hvy. cast (cupola size)	.... 9.50
No. 2 cast	.... 8.00

† Loading on barge.
*25c. higher offered to nearby New Jersey points.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.50 to $8.00
Scrap steel rails	10.00 to 10.50
Short shoveling turnings	.... 7.00
Stove plates	.... 7.00
Steel axles	.... 11.50
Iron axles	.... 11.50
No. 1 railroad wrought	.... 7.00
Rails for rolling	.... 12.50
No. 1 cast	10.00 to 10.50
Tramcar wheels	.... 10.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$9.25 to $9.75
No. 1 heavy melting	9.50 to 10.00
No. 2 heavy melting	8.00 to 8.50
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	11.00 to 11.50
Railroad springs	12.00 to 12.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	9.25 to 9.75
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	11.50 to 12.00
Machine shop turnings	2.75 to 3.25
Heavy turnings	5.50 to 6.00
Steel car axles	12.50 to 13.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	7.00 to 7.50
Steel rails less than 3 ft.	13.00 to 13.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	9.00 to 9.50
No. 1 machinery cast	9.50 to 10.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast	9.00 to 9.50
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$9.50 to $10.00
Borings and short turnings	5.75 to 6.25
Long turnings	$5.75 to $6.25
No. 1 machinery cast	12.50 to 13.00
Automotive cast	13.00 to 13.50
Hydraulic comp. sheets	10.25 to 10.75
Stove plate	7.75 to 8.25
New factory busheling	9.00 to 9.50
Old No. 2 busheling	5.25 to 5.75
Sheet clippings	7.00 to 7.50
Flashings	8.50 to 9.00
Low phos. plate scrap	10.25 to 10.75

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$7.00
Rails scrap	8.00	8.00
Machine shop turnings	3.00	3.00
Boiler plate	4.50	4.50
Heavy axle turnings	4.50	4.00
Cast borings	4.00	3.50
Steel borings	2.00	2.00
Wrought pipe	3.50	3.50
Steel axles	7.00	8.00
Axles, wrought iron	7.00	8.00
No. 1 machinery cast	9.00	9.00
Stove plate	5.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algeria	10.50c.
Iron, low phos., Swedish, average 68½% iron	10.50c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	9.50c.
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	22c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½%	20c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered	$15.50 to $16.00
Tungsten, domestic, scheelite, delivered	15.00

	Per Gross Ton
Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.00 to 16.50
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic Seaboard	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all-rail shipment	$14.00 to $15.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	14.00 to 15.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	14.00 to 15.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.25 to $3.50
Foundry, f.o.b. Connellsville Prompt	4.00 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	9.00
Foundry, by-product, delivered in Chicago switching district	9.75
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	9.24 to 9.72
Foundry, by-product, Phila.	9.03
Foundry, by-product, Cleveland, delivered	9.75
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	$8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.45 to $1.65
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.95
Gas coal, ¾-in., f.o.b. Pa. mines	1.85 to 2.35
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.95
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.30 to 1.45

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 2 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. f.o.b. Baltimore
No. 2 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal., del'd Chicago
No. 2 industrial fuel oil	4.75c.
No. 5 industrial fuel oil	3.75c.

	Per Gal. f.o.b. Cleveland
No. 2 distillate	5.25c.
No. 4 industrial	5.12½c.
No. 5 industrial	4.25c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	5.00	40.00
New Jersey	50.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	55.00
Silica clay, per net ton	8.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	$45.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported f.o.b. Baltimore and Chester, Pa.	$45.00
Domestic, f.o.b. Baltimore and Chester	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	
Machine bolts, 100 count, 65 per cent off list.	
Carriage bolts, 100 count, 65 per cent off list.	
Nuts, all styles, 100 count, 65 per cent off list.	
Large rivets, base per 100 lb	$3.50
Wire, black, soft ann'l'd, base per 100 Lb	*2.70
Wire, galv. soft, base per 100 lb	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lbs.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars:	
Rounds and hexagons	3.35c.
Flats and squares	3.35c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.

Per Cent Off List

Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap. or	
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or	
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87½
Cut point set screws	80
Flat head bright wood screws	50 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	2.95†
Cement c't'd nails, base per keg	2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.26c.
Iron bars	3.26c.
Iron bars, swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	special
Long terne sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x ½ in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21

	Per Cent Off List
Machine bolts, cut thread:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.45c.
Bars, soft steel or iron	3.20c.
Cold-fin. rounds, shafting, screw stocks	3.60c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:	
All quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	2.93c.
‡Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.61c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
†Hot-rolled aneal. sheets (No. 24)	3.65c.
†Galvanized sheets (No. 24)	4.30c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
Cold-finished steel bars	3.25c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.	$2.75
*No. 9 galv. wire, per 100 lb.	3.10
*Com. wire nails, base per keg	2.70

†Outside delivery 10c. less.

*For 5000 lb. or less.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.42c.
Bars, soft steel or iron	3.17c.
New billet reinforc. bars	3.25c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars	3.57c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1in. per 100 lb.	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

Base per Lb.

Plates	3.38c.
Struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.40c.
Round and hex.	3.40c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.63c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb. (2500-lb. lots or under)	3.55
(Over 2500 lb.)	3.45

BOSTON

Base per Lb.

Beams, channels, angles, tees, zees	3.54c.
H beams and shapes	3.54c.
Plates—Sheered, tank and univ. mill, ¼ in. thick and heavier	3.56c.
Floor plates, diamond pattern	5.36c.
Bar and bar shapes (mild steel)	3.35c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.60c.
Tire steel	4.60c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.75c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	4.20c.
Galvanized steel sheets, No. 24 ga.	4.90c.
Lead coated sheets, No. 24 ga.	5.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.00c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.
Galvanized sheets (No. 24)	4.72c.
Bands	3.39c.
Hoops	3.39c.
Cold-finished bars	3.49c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts	70 and 5 per cent off list

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

*Price applies to 1,000 lb. and over.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.31c.
Soft steel bars	3.06c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 20)	4.66c.
Cold-finished steel bars	3.46c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	3.86c.
Boiler rivets, cone head (keg lots)	3.96c.
Boiler rivets, rd. head (keg lots)	3.86c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
*Black annealed wire	3.25c.
†Com. wire nails	2.95c.
Cement coated nails	2.90c.

Per Cent Off List

Machine bolts	70 and 10
Carriage bolts	70 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70 and 10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

*For quantities of 500 to 2500 lb. assorted black annealed and galvanized wire.

†For orders of 50 kegs or less.

ST. PAUL

Base per Lb.

Mild steel bars	3.20c.
Structural shapes	3.45c.
Plates	3.45c.
Cold-finished bars	3.87c.
Bands and hoops	3.55c.
Hot-rolled annealed sheets, No. 24	3.90c.
Galvanized sheets, No. 24	4.56c.
Cold-rolled sheets, No. 20	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On cold-finished bars, hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over.

BALTIMORE

Base per Lb.

*Mild steel bars	2.95c.
*Iron bars	2.95c.
*Reinforcing bars	2.95c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10	3.10c.
‡Hot-rolled annealed sheets, No. 24	3.60c.
‡Galvanized sheets, No. 24	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
§Cold-rolled rounds	3.58c.
§Cold-rolled squares, hex. and flats	3.58c.
Rivets	4.40c.
Bolts and nuts, per cent off list	60 and 10

*Quantity extras per size apply. †Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over, base; 1500 lb. to 1999 lb. add 15c. per 100 lb.; 1000 lb. to 1499 lb., add 30c.; 0 to 999 lb., add 50c.

‡50 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 49 bundles add 25c.

§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add 75c.; for 0 to 299 lb. add $1.25.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.31c.
Iron bars	3.31c.
Reinforcing bars	3.31c.
Structural shapes	3.56c.
Plates	3.56c.
Hot-rolled sheets, No. 10	3.36c.
Hot-rolled annealed sheets, No. 24	4.21c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.61c.
Cold-finished bars	3.98c.

MEMPHIS

Base per Lb

Mild steel bars	3.42c.
Shapes, bar size	3.42c.
Iron bars	3.42c.
Structural shapes	3.67c.
Plates	3.67c.
Hot-rolled sheets, No. 10	3.47c.
Hot-rolled annealed sheets, No. 24	4.27c.
Galvanized sheets, No. 24	4.97c.
Steel bands	3.72c.
Cold-drawn round shapes	3.89c.
Cold-drawn flats, squares, hexagons	5.89c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

Base per Lb.

Mild steel bars	3.30c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.50c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c
Cold-finished steel bars	4.15c.
Structural rivets	4.25c.
Boiler rivets	4.35c.
Common wire nails, base per keg	$3.10
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.50c.	3.60c.	3.55c.
Shapes, standard	3.50c.	3.60c.	3.55c.
Soft steel bars	3.50c.	3.60c.	3.70c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.60c.	3.70c.	3.75c.
Galv. sheets (No. 24)	5.00c.	4.95c.	5.00c.
Cold finished steel Rounds	5.80c.	5.85c.	6.00c.
Squares and hexagons	7.05c.	7.10c.	7.25c.
Flats	7.55c.	7.60c.	8.25c.
Common wire nails —base per keg less carload	$3.20	$3.20	$3.20

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

	Base per Lb.
High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Philadelphia Steel Output Is Advanced to 40 Per Cent

Leading Interest Boosts Rate Sharply —Finished Steel Sales in September Average 10 to 20 Per Cent Ahead of August

PHILADELPHIA, Oct. 1.—The beginning of the fourth quarter finds the eastern Pennsylvania territory showing definite improvement in practically all finished steel lines. It is also significant that gains have been registered without the benefit of railroad buying. On the other hand, shipbuilders in the territory are busier than they have been since 1930 and the widely diversified miscellaneous consumers of steel in the district have all become more active buyers.

The leading interest has boosted steel ingot production in this territory rather sharply and a large independent producer has put on another open-hearth. The average operating rate of the district has consequently been raised two points to 40 per cent, and there are prospects of further gains in the next fortnight. Two merchant blast furnaces have been blown in during the last month and another unit is shipping more than its current output.

Among the various finished steel products, plates have probably shown the greatest improvement in the last month. In addition, the Navy Department is taking bids this month on at least 10,000 tons and the Norfolk & Western railroad has announced plans for the building of 500 hopper cars in its own shops. Miscellaneous tank work is still rather quiet, but fabricators in this territory are bidding on a number of plate projects in various parts of the country, the steel for which will probably be rolled in the East.

Price weakness is the most bearish factor in the current market. While the larger producers seem to be adhering to the quoted levels, shading is reported on plates, reinforcing bars and wire nails. In the face of these pre-code tendencies, increasing demand, along with war possibilities in Europe and higher fuel costs, has led to talk in some quarters of higher steel prices.

Pig Iron

The current upturn in general business has led to a more marked increase in demand for pig iron than is the case in finished steel. September shipments have averaged 20 per cent ahead of August and further gains are expected in October. Two merchant furnaces have been blown in during the last month and another seller is shipping more than the output of one furnace. Increased fuel costs will soon be reflected in pig iron producing charges and talk of higher prices for 1936 is heard. On the other hand, foreign iron is still being offered at Philadelphia at prices considerably under domestic levels.

Bars, Plates and Shapes

The heavy hot-rolled products have felt the recent upturn in steel demand more definitely than has been the case since the low point of the depression was reached. Plates, which have been especially dull in the past, are at last more active because of increased activity in shipyards and in the plants of small miscellaneous consumers. The leading Philadelphia district shipyard is not expected to bid on the cruiser for which the Navy Department is taking bids this week, but mills in this territory will certainly share in the 10,000 tons or more of plates on which the Navy has asked for bids. A nearby concern is also bidding on a dredge for the United States Engineer at Louisville, Ky., requiring 300 tons of plates. The Norfolk & Western will build 500 hopper cars in its own shops, but other railroad demand is lacking. Structural steel and reinforcing bars are more active, partially because the Pennsylvania State Highway Department is finally going ahead with its road building program. At least 1000 tons of structural steel will be required on highway bridge jobs coming out in the next two weeks. Merchant and alloy steel bars are moving at a somewhat better rate.

Sheets and Strip

The Edward G. Budd Mfg. Co. has taken a contract for two more stainless steel trains of the "Zephyr" type for the Chicago, Burlington & Quincy. This company is also an active buyer of sheets for automobile bodies and is taking out substantial tonnages for frame construction. Other metal stamping plants in this district are busier and jobbers bought relatively large supplies of galvanized sheets before the differential was eliminated Oct. 1. Strip steel demand from radio makers is improving and has not reached its peak for the current season. Sheet and strip prices are well maintained.

Imports

The following iron and steel imports were received here last week: 1702 tons of pig iron from British India; 48 tons of steel tubes, 35 tons of steel bars, 1 ton of steel rods and 1 ton of steel forgings from Sweden; 18 tons of structural shapes and 14 tons of steel plates from Germany, and 10 tons of ferromanganese and 10 tons of drill steel from Norway.

Scrap

Increased steel operations and continued scarcity of scrap have given the market a firmer undertone. Dealers are paying $12 for No. 1 heavy melting steel for delivery at nearby plants and seem to be quite satisfied that consumers are showing no disposition to make further purchases at $12.50. An additional consumer No. 2 steel has appeared in the last week and is paying $11 for delivery in the Philadelphia district. Some scrap is being bought for export, but no new contracts are being arranged. The foundry grades are quiet with prices unchanged.

Reinforcing Steel

Awards 5,250 Tons—New Projects 24,900 Tons

AWARDS

St. Louis, 1800 tons, superstructure for post office, to Laclede Steel Co.

Cap au Gris, Mo., 550 tons, locks, to Inland Steel Co.

Tiger River Project, W. Va., 500 tons, to Concrete Steel Co.

Des Plaines, Ill., 165 tons, waterworks, to an unnamed bidder.

Phoenix, Ariz., 200 tons, stadium, to an unnamed bidder.

Los Angeles, 1600 tons, Colorado River aqueduct, purchased by general contractors from unnamed bidders.

San Pedro, Cal., 428 tons, post office, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Cleveland, 380 tons, including 100 tons of merchant bars for several buildings for Easterly sewage disposal plant: bids Oct. 17.

Milwaukee, 1800 tons, filtering plant: bids closed Oct. 1.

Cairo, Ill., 550 tons, seawall; bids opened by United States Engineers at Memphis.

Peoria, Ill., 375 tons, locks on Illinois River.

Denver, 115 tons, siphon piers on South Boulder diversion conduit; bids Oct. 7.

State of California, 130 tons, bridges in seven counties; bids opened.

Nogales, Ariz., 120 tons, channel and stilling basin on Nogales flood control project; bids Oct. 15.

Los Angeles, 16,850 or 22,350 tons, 123 to 152-in. precast concrete pipe on Colorado River aqueduct, 544 tons to be furnished by Metropolitan Water District under this alternate. Under alternates for cast-in-place concrete pipe, the district will furnish 20,818 tons of bars; bids to be opened Oct. 24.

State of Oregon, 220 tons, bridges in six counties; bids Oct. 9.

State of Washington, 105 tons, bridges in two counties; bids Oct. 15.

German Steel Exports Continue To Increase — Stainless Especially Active

HAMBURG, Sept. 16 (*By Special Correspondence*). — Germany's iron and steel exports still show a continuous upward movement. In July the figures reached new records and the total was the highest for any month since 1929. Excluding cast iron and foundry products, scrap, wire and wire products, bolts, rivets, hardware products, nails and cast iron pipe, the total was 227,195 tons. With the above products, it was slightly over 300,000 tons. This compares with 195,486 tons in June, 186,635 tons in May and 127,410 tons in July, 1934.

Export of steel bars were 72,997 tons, the highest in any month since 1928. Steel tubing exports amounted to 26,618 tons, compared with 18,356 tons in June, 11,333 tons in May and 9287 tons in July, 1934, and were the highest ever reported. Tin plate exports of 12,287 tons also established a record. A further rise in exports is anticipated. The large volume of this business is due chiefly to barter and compensation agreements with more than 27 countries, by which Germany is securing her raw materials by exporting steel and other industrial products.

The Federation of Machinery Manufacturers also reports that exports are improving. In July 5000 more men were employed. In August another 2800 men went to work in the machinery industry and operations were increased by another 2 points.

German steel companies have stopped quoting open-hearth ship plates, as the industry is overstocked with orders and cannot execute export business.

Demand for corrosion-resisting steel products in world markets is showing an extraordinary increase. Germany started to export such steel in 1929, but in 1929 and 1930 the movement was negligible. Since then the figures have shown a sharp gain. Only 400 tons of sheet piling of corrosion-resisting steel was exported in 1930, but in 1933 nearly 15,000 tons was shipped. In 1934 approximately 20,000 tons was exported and this year, judged from first seven months, the figure may exceed 35,000 tons. Another important item is corrosion-resisting steel for bridge construction. Krupp supplied 14,000 tons of such steel last year for the Danish bridge, the largest in Europe connecting the Continent with the Island of Fünen. The present export quantity of this steel is exceeding 30,000 tons a year, or 10 times more than four years ago. Containers, wire and wire products, water and oil tanks, ship construction materials, etc., are other products for which demand has expanded. In France, Italy and Germany the army and navy buying departments are specifying only such steel for engineering materials, bridges, and also for many parts of arms.

World Production Again Rises

WORLD industrial production continued to advance during the month of July, according to the regular monthly survey of the National Industrial Conference Board. Improvement was general in practically all sections except South and Central America where business activity remained dull.

The volume of residential construction continued to increase in England but consumption of coal, electric power and iron and steel was somewhat lower during July than in June. In the absence of serious international complications, a change in the credit policy, or a rapid increase in wage rates, it is considered that the expansion of economic activity in Great Britain is likely to continue during the coming months. Under the influence of a credit policy directed to the maintenance of low interest rates, profitability of British enterprise is still on the upgrade.

Italian activity continued to be stimulated by orders for military purposes. German and Belgian industry operated at a considerably higher rate than during July, 1934. Political uncertainty in Holland and France continued to react unfavorably on industry, but during early August improvement occurred in the political situation of these countries and business activity revived somewhat.

International trade declined by more than the usual seasonal proportions during June. The total value of foreign trade in terms of gold for 76 countries stood at 32.4 per cent of the average monthly value in 1929, which was 3.6 per cent lower than in June, 1934. The volume of trade, however, remained between 75 per cent and 80 per cent of the 1929 average. Increases in the value of exports were registered in July for Holland, Germany, Japan, and China, while decreases were reported for England, Switzerland, Argentina and the United States.

Corporation Builds Its First Navy Vessel

THE launching of the destroyer U. S. S. Flusser at Kearny, N. J., Sept. 28, marked the maiden effort of the Federal Shipbuilding & Drydock Co., Steel Corporation subsidiary, in the construction of naval vessels. Among those present at the ceremony were the Assistant Secretary of the Navy, admirals, vice-admirals and officers and men of the Navy.

In explaining the Federal company's entry in the naval construction field, Myron C. Taylor, chairman of the board of directors, United States Steel Corpn., recounted how the shipyard had been set up during the late war to serve the cause of the Government and the allies. It was kept going through the depression, in part to provide work for those who had served during times of need and also to "match faith in the future" with that of the Grace Line, for which the company built four ships of the Santa class.

Addressing himself to the necessity for war vessels Mr. Taylor said: "Men of industry consider war a great destroyer and an unsettler of their affairs, and all would welcome its abolition. The last war in its ultimate effect nearly destroyed all industry. Industry comes on the scene only after statesmanship and diplomacy have failed, or when government itself fears its inadequacy or failure."

Cleveland Rate Drops Seven Points to 59 Per Cent

Delay in Automotive Business Is Felt by Sheet and Strip Mills—Chesapeake & Ohio About to Award Rail Tonnage

CLEVELAND, Oct. 1.—Ingot output in the Cleveland-Lorain territory dropped seven points this week, one of the local mills having taken off three open-hearth furnaces. While miscellaneous demand for finished steel continues quite satisfactory, steel plants are still awaiting the receipt of substantial orders from motor car manufacturers. The delay of the automotive industry in placing large tonnages for new models is felt particularly by sheet and strip mills. Some sheet mills curtailed operations this week and others do not have much tonnage on their books.

Bids for 21,842 tons of rails were taken by the Chesapeake & Ohio Railroad Monday but the awards are not expected for a few days. The business probably will be divided among several mills.

Recent changes in prices and differentials became effective today, the more important change being the advance of the Cleveland bar base to 1.95c. with new quantity differentials. Some of the mills accepted orders until Oct. 1 at the old price for quantities that would give buyers some advantage over the new price, these orders being taken for delivery at the convenience of the mills. A considerable number of bar consumers have placed fourth quarter contracts, some of this business coming from buyers who will pay the advanced price.

Elimination of the $2 a ton differential on galvanized sheets to jobbers and roofing manufacturers does not seem to cause much anxiety among some of the buyers affected, who are rather confident they will still be able to secure the $2 a ton concession.

Pig Iron

While the market continues fairly active, sales were not so heavy the past week as during the previous weeks following the opening of books for the fourth quarter. As most foundries are covering for the quarter, spot shipment orders have virtually disappeared. Shipments by Lake furnaces in September gained 30 per cent over August, and a further gain is looked for this month as the demand from motor car foundries is on the up-trend.

Coke

By-product foundry coke was advanced 50c. a ton Oct. 1 to $9.75, Cleveland, the advance being brought about by higher coal prices. This is the first change in by-product fuel since Nov. 1, 1933, except for minor revisions that resulted from increased freight rates.

Bars, Plates and Shapes

Miscellaneous demand for merchant bars is well maintained. While orders from forge shops doing automotive work have declined, some improvement is reported in business from other makers of automotive parts. Structural shapes continue to move in good volume in small lots. Fabricators are figuring on a building in Indianapolis for the Chevrolet Motor Co. requiring 2942 tons. Public work is slack but will be stimulated by a PWA award for Ohio made this week. New projects include two school buildings in Cleveland. On an inquiry for 150 tons of reinforcing bars for FERA work two bidders made a concession by quoting 1.95c., Cleveland, instead of adding 2½c. additional, the amount of the switching charge, and 12 adhered to the regular 1.97½c. price. Buildings for the Easterly sewage disposal plant, Cleveland, will require 280 tons of reinforcing bars and 100 tons of merchant bars. Alloy steel bars, which have been slow, are showing a little more life.

Sheets

Orders from stamping plants in this territory for sheets for running boards, grilles and other automobile parts, show a moderate gain. Enameling sheets are moving in good volume. Manufacturers of gas stoves, who are very busy, are specifying good tonnages. Demand from burial vault manufacturers, which has been slack for some time, has improved. The local sheet mills are in full operation this week.

Strip Steel

Specifications are fair from motor car accessory plants and from jobbing stampers doing automotive work. New orders are expected shortly from some of the General Motors parts plants, which previously covered for their requirements until about Oct. 15 and are stepping up production. The local cold strip mill is operating at 50 per cent of capacity this week.

Warehouse Business

Steel bars were advanced $1 a ton to 3c. a lb., Oct. 1, reflecting the advance in the mill price. Jobbers also revised their size extras on hot-rolled and cold-finished bars and their quantity differentials on the latter to correspond with the new mill extras on these products. Galvanized sheets were not changed with the withdrawal of the $2-a-ton differential to jobbers.

Bolts, Nuts and Rivets

Good specifications for bolts and nuts are coming from motor car and agricultural implement manufacturers and from miscellaneous consumers and jobbers. September shipments gained 20 per cent over August. Consumers are placing fourth quarter contracts. Makers are still complaining that prices are too low and hope that the volume of business will be sufficient to enable them to make an advance during the quarter. While rivets are not active, they are moving in a little better volume than recently.

Scrap

The market is inactive but firm. While brokers have their outstanding orders with the mills nearly filled, they are still buying some scrap, paying $13.25 for No. 1 heavy melting steel for Youngstown delivery and $8 to $8.25 for blast furnace scrap for Cleveland delivery. The Chrysler Motor Corpn. has issued a list of approximately 5000 tons of miscellaneous scrap, covering its estimated October production.

Scrap Prices Up At Detroit

DETROIT, Oct. 1.—Although prices of many items have advanced 25c. a ton, the local scrap market is not yet reflecting the anticipated increase in steel operations when automotive steel demand picks up shortly. The Detroit steel plant is not willing to pay higher prices and whatever rise has occurred in quotations can be traced to speculative buying on the part of dealers. Hydraulic compressed sheets are bringing 75c. a ton more than heavy melting steel, being quoted at $10.25 to $10.75.

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P&H HANSEN ARC WELDERS

Sheet Demand Up In Southern Ohio

CINCINNATI, Oct. 1.—Demand for finished sheets has moved upward again, following increased specifications from automotive manufacturers. Bookings from miscellaneous sources are unabated, bringing total demand, in the district, to about 80 per cent of mill capacity. Jobbers' purchasing is exceptionally good and mills are operating near 100 per cent in the enamel, roofing and galvanized sheet departments. Prices remain steady and consumers show little disposition to anticipate beyond Nov. 1.

Steel ingot production in the lower Ohio River district has advanced 11 points to about 82 per cent of capacity.

Ordering of pig iron in single-car to 100-ton lots remains active, with total tonnage adhering to a weekly average of about 800 tons. Southern iron is in greater demand, furnace interests reporting orders for about 350 tons. Foundry operations are up, the district average being about 50 per cent. Machine tool melters are more active, while stove and automotive foundries show little change.

Warehouse business in September was better than in August. Demand is almost entirely from industrial sources, since construction is still slow.

Dealers' bids on scrap have advanced, in sympathy with the stronger tone in other areas. Ordering is small. Shipments on contract have been slower, following the imposition of embargo by one mill in the area.

Pig Iron Buying Heavy in St. Louis

ST. LOUIS, Oct. 1.—Pig iron contracting for fourth quarter continues active for both Northern and Southern iron, with the result that the opening of the quarter shows a heavier order file than has prevailed at the opening of any quarter in the last few years. Better business and the feeling that prices will advance have caused the marked improvement in commitments. The stove plants in the Belleville district have been working six days a week ever since Sept. 15, when they were permitted to do so under an agreement with the molders' union, and this situation is expected to continue for the next three or four weeks or even longer, depending upon the weather.

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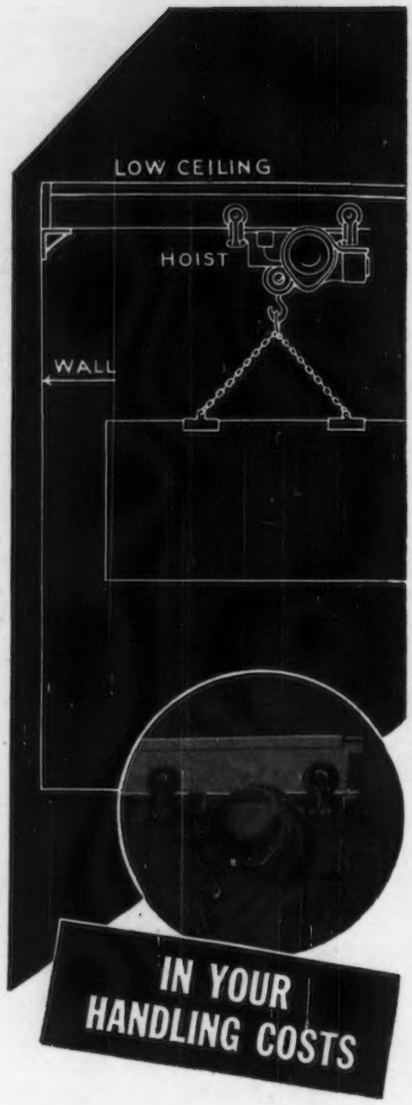

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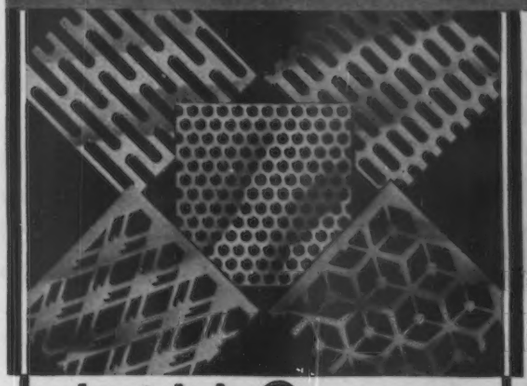
P&H MILWAUKEE ELECTRIC HOISTS

iron and steel trade. The Laclede Steel Co. has been awarded 1800 tons of reinforcing bars for the superstructure of the St. Louis post office. The United States Engineer's office here has recommended the award of the contract for Lock No. 25 near Cap au Gris, Mo., requiring 1300 tons of structural steel, 114,000 sq. ft. of steel sheet piling and 558 tons of reinforcing bars to the low bidder, United Construction Co., Winona, Minn. The structural steel has been committed to Mississippi Valley Structural Steel Co. The United States Engineer's office at Memphis opens bids today for a sea-wall at Cairo, Ill., requiring 550 tons of reinforcing bars and 98,000 sq. ft. of steel sheet piling.

The only change in the scrap market is an advance of 75c. a ton in No. 1 heavy melting steel. Offerings from country dealers are being made more freely as a result of a weaker tendency in Chicago and Eastern markets. Dealers here are buying to cover only on orders, and the short interest is thinning rapidly. District steel mills are marking time, and not much business is expected from them for the next 30 days. The Missouri Pacific has issued a list of 25 carloads of scrap, which will be closed this week.

PERFORATED METALS



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OBITUARY

H. C. FOWNES, a leading industrialist of the Pittsburgh district, died at his home at Oakmond, Pa., after a brief illness. He was 79 years old. He was one of the organizers of William Clark & Sons Co., who erected the first mill in the Homestead Steel Works, and also helped to organize the Solar Iron Co., Rust Boiler Co., Midland Steel Co., Reliance Coke Co. and the Standard Seamless Tube Co.

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MRS. MYRTLE STEVENS BENNETT, president and one of the founders of Wilson & Bennett Mfg. Co., Chicago, maker of steel containers, died Sept. 23 after a month's illness. She helped to found the company in 1909 and watched the organization grow until it had branches in New Orleans and Jersey City, N. J. She was 71 years old.

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ARTHUR H. BUHL, SR., president and general manager of Buhl Sons Co., Detroit, large hardware jobbing house, died on Sept. 26. He was vice-president of the Buhl Stamping Co., Detroit, and was an officer or director of numerous Detroit companies. Born in Detroit in 1878, he went to Sharon, Pa., in 1892 where his father, Christian Buhl, owned and operated the Sharon Iron Works and the Buhl Steel Co., within four years becoming secretary of both companies. Later he returned to Detroit and entered Buhl Sons Co., eventually becoming secretary, vice-president and general manager. In 1915 he was elected president. He also was vice-president of the Buhl Aircraft Co., organized in 1925 to make commercial airplanes.

THOMAS WILLIAM BROOKS, one of the best known Western representatives of the United States Steel Corpn., whose death was announced in these columns last week.

A. F. BRUNCK, sales manager of the Ziv Steel & Wire Co., Chicago, died in that city on Sept. 22. He was for the last 18 years actively engaged in the sales of Darwin & Milner steels for which the Ziv company acts as agent.

War Department Approves Plans for Projects

WASHINGTON, Oct. 1.—Approval has been given by the War Department to plans for the following projects:

Fixed bridge across Connecticut River between Middletown and Portland, Conn. Application by Middlesex County, Conn.

Drawbridge across Bayou Lacombe, near Lacombe, La. Application by Louisiana Highway Commission.

Bridge across mouth of New Creek at South Beach, Staten Island, N. Y. Application by Borough of Richmond, New York.

The Department also approved an application by the Board of County Commissioners of PalmBeach County, Florida, to extend from Oct. 24, 1936, to Oct. 24, 1938, times for commencing and completing construction of bridge across Lake Worth, Lake Worth, Fla. Request for extension of time is due to delay in obtaining assistance from the PWA.

Heavy Rolled Products More Active in New York Area

Subway Section, Triborough Approaches and Navy Vessels Call for Round Tonnages—Second-Hand Material Shipped Here from Chicago

NEW YORK, Oct. 1.—Demand for heavy rolled steel products is beginning to figure more prominently in this market. Bids go in this week on the first section of the Sixth Avenue subway, Manhattan, requiring 3300 tons of structural steel and 250 tons of reinforcing bars, and on Oct. 10 figures will be taken on the Randalls Island approaches of the Triborough bridge, calling for 6000 tons of reinforcing steel. On Oct. 15 the Navy Department will receive tenders on 4500 tons of plates, shapes and bars for a cruiser and three submarines to be built in the Brooklyn Navy Yard. PWA work is approaching the bid taking stage. For New York State allotments of $23,000,000 have been approved, covering a variety of jobs. The majority of them are school buildings, though there is a scattering of sewer, water works, paving and power station projects. A PWA allotment of $3,363,758 has been approved for expansion of the Newark, N. J., airport.

Directors of the Norfolk & Western have authorized the taking of bids Oct. 16 on 10,000 tons of rails and accessories. This road also plans to build 500 all-steel hopper car bodies in its Roanoke, Va., shops. Close to 7000 tons of steel will be required.

There was considerable anticipatory buying of bars and galvanized sheets in September, and while most of this steel has been delivered, shipment prior to the new quarter has not been insisted upon in the manner that it was under the code. Lenience in allowing third quarter shipments to lap over into the fourth quarter probably accounts for some of the current reports of price variations. In the case of concrete bars, price concessions by distributers have reached the point, in some cases, where they exceed the resale margin. Reports of weakness in wire nails and plates are beginning to appear. Nails have always been under severe pressure because distributers have customarily used them as "loss leaders."

Both second-hand and foreign steel are troublesome competitive factors in this market. Last week the fourth barge load of reclaimed material from the Chicago World's Fair arrived here. This cargo consisted of 1300 tons of beams in 25 to 60-ft. lengths. Total shipments to date amount to 3500 tons. The steel is being sold at about $32 a ton. Additional shipments are expected next spring. Truck deliveries of foreign bars are being made in this district at 2.05c. a lb. for 1000-lb. lots.

Pig Iron

The market continues to reflect improved business conditions on a broad front. Sales in this district last week were approximately 5800 tons, compared with 5600 tons sold in the previous period. Buyers' interest is focused mainly on fourth quarter requirements but substantial amounts still remain to be contracted for. Apparently agitation has entered the ranks of consumers with respect to the Guffey coal bill. Passage of this measure, entailing a rise in the cost of coal and a consequent rise in coke prices, conceivably may force pig iron producers to take steps in defense of their profit margins. Most buyers appear to be well apprised of this situation and intend not to be caught napping. So far as is known, however, no movement is yet under way to alter existing prices. Jobbing foundries were considerably more active last week than they have been in the immediate past, and the effects of the machine tool show in Cleveland, resulting in heavy orders, has had its proportionate repercussions on the pig iron market in this district and New England.

Reinforcing Steel

Demand improved considerably last week as compared with earlier periods, but cases of price infringements continued to crop out. About 375 tons of mesh for a highway in Oswego County, N. Y., was awarded the American Steel & Wire Co., and 250 tons of mesh went to the Concrete Steel Co. for a highway in Ulster County, N. Y. An award of 825 tons of bars for a sewage project at Ward's Island, N. Y., has practically been concluded, but awaits the final clearing up of incidentals. Inquiry with respect to heavy tonnages already reported is still active.

Scrap

Consumer purchasing of scrap has been quite light in this district during the past week and dealers have confined their activity to routine buying against old contracts. Prices are no weaker and some brokers are finding it necessary to boost their offering figures slightly on some grades. The export market is definitely dull, although a fair amount of inquiry is before the trade. Exporters are unwilling to make commitments with Italy because of the high insurance rates and there is also some uncertainty about the attitude of the Government toward scrap exports in case of the actual outbreak of hostilities. A few Japanese inquiries are out, but that country cannot be said to be actively in the market.

Output Rises In South

BIRMINGHAM, Oct. 1.—There was an increase of two open-hearths last week and operations now equal the high point of the year, established in March and April when the Ensley rail mill was in production. Thirteen open-hearths out of 24 are now active. An extra unit was added last week by both Tennessee Coal, Iron & Railroad Co. and Gulf States Steel Co. At Fairfield, eight out of nine open-hearths are in operation, while at Alabama City five out of six are also operating. Thirteen are scheduled to be worked again this week.

Bookings of general lines of steel continue good. Wire products and building sheets are especially active. Bar, plate and structural shape tonnage has also been growing. New price schedules, based on quantity, with jobber differentials eliminated, have been put into effect. Quantity prices on sheets and wire products became effective today, and this change may have contributed somewhat to the improvement that has been in progress for nearly two months.

The pig iron market is improving slowly, but buying is far from active. Foundries continue to order in small lots, as a rule, but such orders are now more numerous. There has also been a gradual ac-

cumulation of advance fourth quarter tonnage. Six blast furnaces are operating, and this number has been unchanged for six weeks. Woodward Iron Co. was planning to fire up a second stack last week, but postponed doing so on account of the coal strike.

All Alabama coal mines were closed down last week, but furnace companies have sufficient stocks on hand to insure steady operations for some time to come.

It is now expected that the Ensley rail mill will resume rolling the latter part of October.

Hardie-Tynes Mfg. Co. shipped a large butterfly valve to Boulder dam last week, and another is going forward this week. The company has contracts for seven.

The cast iron pipe market is quiet, and marking time pending the release of PWA business. Most current orders are small and very little is expected during the next week or so.

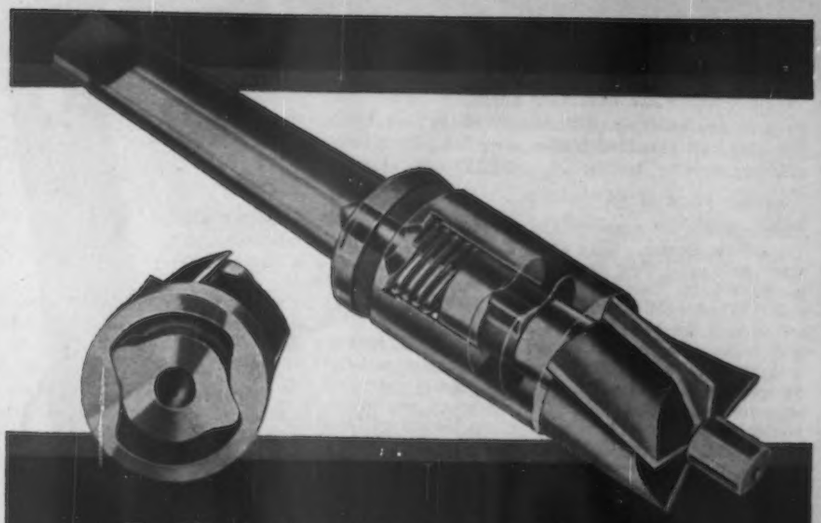
Boston Scrap Market Is Easier

BOSTON, Oct. 1.—High war risk insurance rates, lack of steamer space and uncertainty regarding the status of scrap in the event of war in Africa have brought the old material export market practically to a standstill and some easing in prices offered by shippers. Exporters now will not pay more than $9 to $9.25 a ton delivered dock for No. 1 steel, nor more than $8 to $8.25 for No. 2 steel, whereas the last reported purchases of No. 1 were at $10 a ton, made about ten days ago. Prospects of scrap buying by domestic mills are fading, and going quotations are easier. The one bright spot in the scrap market is shafting, for which there is a good demand at prices about $1 a ton higher than heretofore. Few steel axles are moving, but the market for them is firmer with shafting.

Sales of 100, 200 and 300-ton lots of pig iron were fairly plentiful the past week, and included a rather wide variety of brands. Aggregate transactions were about on a par with those of the preceding week. Connecticut jobbing foundries are doing well, but those in other New England States are not so active. The average New England melt is now 35 to 40 per cent of rated capacity, with indications of going higher shortly.

Possibilities of foundry coke prices being moved up within the near future have somewhat increased the movement of that material.

Warehouse sales are slightly better, with prices unchanged.



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Buffalo Rate Advances

BUFFALO, Oct. 1.—With demand for sheets, bars and structural material well sustained, the Lackawanna plant of the Bethlehem Steel Co. has increased its last week's operation of 11 open-hearths to 12 and may put on two more before the end of the week, giving the plant its peak operation for the year. The Seneca sheet division of Bethlehem has increased output to 80 per cent of capacity; Republic Steel Corpn. continues to operate four open-hearths and Wickwire-Spencer Steel Co., two.

Fabricators of structural steel say that considerable small-tonnage business is moving. With the approval of the $23,000,000 PWA projects for New York State, quite heavy structural and reinforcing bar business looms. Twenty or 30 schools, including new structures and additions, are on the PWA program. The structural steel and reinforcing bars in this program will undoubtedly reach several thousand tons. The demand for PWA material will come during the winter and the spring.

A great deal of interest exists in the pig iron market. Tonnages are more sizable, with several inquiries out now for 2000 tons apiece. The Lackawanna plant of Bethlehem is operating three blast furnaces during a change-over, though the total output is about that of two furnaces operating normally.

A strong demand for railroad malleable is a feature of the scrap market. The price is $14 to $14.50. Scrap is not plentiful, and increased buying is looked for shortly.

Large Pipe Line Up For Bids on Coast

SAN FRANCISCO, Sept. 30.—Major steel tonnages are involved in the specifications for 25.09 miles of pipe line for the Colorado River aqueduct, on which the Metropolitan Water District will open bids Oct. 24 at Los Angeles. Under alternates for 123 to 152-in. diameter precast concrete pipe, the contractor will furnish 22,350 tons of reinforcing bars and will place 544 tons of bars and 157 tons of miscellaneous steel furnished by the district. If the steel alternates for 24,525 ft. of 130-in. diameter pipe, requiring 10,632 tons of plates, is accepted the reinforcing bar tonnage will be reduced 5500 tons. If bids for 12 and 13-ft. diameter cast-in-place concrete pipe are accepted the district will furnish 20,818 tons of reinforcing bars, 906 tons of plates and 142 tons of miscellaneous steel in addition to the above plate requirement.

The district again received identical bids for the furnishing of 2000 tons of steel-reinforced aluminum conduit or 3000 tons of steel-reinforced copper conduit. As soon as a choice is made on the type of conduit an award of 5500 or 5750 tons of structural steel will probably be made to Pacific Coast Steel Corpn., the only company whose bid was not rejected.

Among the limited number of bookings during the week, the award of 1700 tons of plates to Steel Tank & Pipe Co. was outstanding. This placement was made by the East Bay Municipal Utility District of Oakland, Cal., for a pipe line at Crockett, Cal. The report that Colorado Fuel & Iron Products Co. took 781 tons of rail bars and 340 tons of structural billets for the mint at San Francisco has not yet been confirmed.

Activity in the cast iron pipe market on the Coast has been confined largely to small tonnages for projects in the Utah and Idaho areas, which apparently were tardy in receiving the benefit of Government money. Few cast iron pipe contracts of any importance are in the offing.

The warehouse price schedule in San Francisco will show slight revisions, effective tomorrow. No changes have yet been reported for the Los Angeles or Seattle districts. Warehouse business is showing an upward trend.

Pipe Lines

Cumberland Transportation Co., Nashville, Tenn., care of Banks P. Turner, 2102 Turner Avenue, head, recently organized, plans welded steel pipe line from natural gas fields in Morgan County, Tenn., to point near Knoxville, Tenn., for gas supply in latter district.

Central Michigan Pipe Line Corpn., Clare, Mich., plans welded steel pipe lines from natutral gas fields in Surrey, Grant and Lincoln townships, Clare County, to connection with system of Gas Corpn. of Michigan, Mount Pleasant, Mich., for gas supply for last noted company, which will distribute at Mount Pleasant, Clare and vicinity. First mentioned company is arranging financing through stock issue.

Edwards, Miss., plans steel pipe lines for natural gas distribution. Cost about $24,000. Financing will be arranged through Federal aid. H. L. Miller, Vicksburg, Miss., is consulting engineer.

Kokomo Gas & Fuel Co., Kokomo, Ind., operating local artificial gas plant, plans natural gas supply for city, with construction of welded steel pipe line to connection with system of Panhandle Eastern Pipe Line Co., Kansas City, Mo., at point near Dana, Ind., which will furnish trunk line service.

Godfrey L. Cabot, Inc., 77 Franklin Street, Boston, carbon black products, etc., plans about 5500 ft. of welded steel pipe line in connection with development of natural gas properties near Hebron, Potter County, Pa., where several wells will be drilled. Number of smaller connecting pipe lines will also be installed. Cost over $75,000.

Updegraff Natural Gas Co., Ellisburg, Pa., operating natural gas properties near Potter, Pa., and Allegheny, N. Y., plans welded steel pipe line from Ellisburg to city limits of Wellsville, N. Y., for natural supply to that district. Negotiations are under way with municipality. Project will include about 21 miles of 4 and 2-in. steel pipe for distributing lines in city, to be installed as separate enterprise by Board of Trustees.

Simrall Pipe Line Co. is planning a 140 mile oil line from Crystal Township field to Toledo.

September Copper Sales Total 85,000 Tons—Current Demand Light

Tin Stronger As World's Visible Supply Again Declines Sharply—Lead and Zinc Firm But Quiet

NEW YORK, Oct. 1.—Nothing unusual with respect to copper occurred last week. Sales were moderate and about the same from day to day. Total September bookings were about 85,000 tons. Brass fabricators are active copper consumers, and are finding foreign outlets for their products. Domestic prices hold at the level last reported, while foreign quotations today ranged from 8.70c. to 8.80c. a lb., usual Continental base ports.

Bookings increased moderately in this area last week as compared with the preceding period, and prices advanced steadily but to no great extent. Deliveries were principally for spot and October. Pressure on spot metal at New York again induced sellers to export, and, on Sept. 27, 75 tons was reshipped to England. The extreme delicacy of the war situation abroad has resulted in most shipments of Straits metal being rerouted by way of the Cape of Good Hope. September statistics indicate that deliveries totaled 5360 tons. At the same time, the world's visible supply of tin decreased by 2583 tons, leaving a total of 11,635 tons. The present visible amount is comparatively small and may have prompted buyers to become more active last week. Straits metal sold here today at 50.15c. a lb., while in London this morning standard tin was quoted at £230 15s. for spot and £218 for futures. In the East the price was £223 5s.

Zinc

Owing to heavy accumulated backlogs on producers' books, forward sales are not very active at present. A routine amount of business continues to occupy the market, and prices are firm. Attempts last week by certain mining interests to reduce ore output did not become generally effective. However, Joplin producers have agreed this week to restrict operations to 5000 tons as against 9200 produced last week. This is a development not clearly understood, though possibly it reflects an interest in higher prices for ore. Last week's sales in this district totaled 2231 tons for well-rounded fourth quarter delivery. Producers will open books today for January. Despite its featureless character, the market remains firm, and prices continue at 4.75c. a lb., East St. Louis, and 5.12½c. a lb., New York, for Prime Western grades.

Lead

The market was again stimulated last week by renewed demand for October lead, and producers became even more reticent to open books for November. However, refusals have not been outright, with the result that out of total bookings registered last week by one leading producer approximately 30 per cent was for delivery in the latter month. Certain other interests have not discriminated against November stipulations, but nonetheless have contracted principally for October. In several cases, producer current intake has fallen short of requirements and forward allotments have been drawn from to satisfy demand. This does not indicate a shortage of metal in view of the substantial stocks which are held. It does, however, contain bullish features. Practically all sources of consumption have been active with the single exception of the cable industry. Prices are unchanged at 4.35c., St. Louis, and 4.50c., New York.

Metal Specialty Co., Cincinnati, has completed negotiations for operating manufacturing division at Kokomo, Ind., and will begin operations in approximately three weeks. Company is a contract manufacturer of stamped, formed, pressed, drawn, welded and assembled metal products, already operating plant in Cincinnati and maintaining branch sales office in Detroit.

The Week's Prices. Cents Per Pound for Early Delivery

	Sept. 25	Sept. 26	Sept. 27	Sept. 28	Sept. 30	Oct. 1
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, N. Y.	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, spot, New York	49.50	49.65	49.87½	....	50.25	50.15
Zinc, East St. Louis	4.75	4.75	4.75	4.75	4.75	4.75
Zinc, New York†	5.12½	5.12½	5.12½	5.12½	5.12½	5.12½
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	4.35
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

*Refinery quotations; price ¼c. higher delivered in Connecticut.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19c. to 21c. a lb., delivered.
Aluminum, No. 12 remelt, No. 2 standard, in carloads, 16.50c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.25c. a lb., New York.
Quicksilver, $69 to $71 per flask.
Brass ingots, commercial 85-5-5-5, 8.50c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse
Delivered Prices, Base per Lb.

Tin, Straits pig	51.25c. to 52.25c.
Tin, bar	53.25c. to 54.25c.
Copper, Lake	10.00c. to 11.00c.
Copper, electrolytic	10.00c. to 11.00c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.37½c.
*Seamless brass tubes	16.37½c.
*Seamless copper tubes	16.50c.
*Brass rods	12.87½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.85c. to 5.85c.
Lead, bar	5.85c. to 6.85c.
Lead, sheets	8.25c.
Antimony, Asiatic	14.50c. to 15.50c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	30.00c. to 31.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse
Delivered Prices per Lb.

Tin, Straits pig	54.75c.
Tin, bar	56.75c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slabs	6.25c. to 6.50c.
Lead, American pig	5.10c. to 5.40c.
Lead, bar	8.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	58.75c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.62½c.	7.37½c.
Copper, hvy. and wire	6.50c.	7.00c.
Copper, light and bottoms	5.50c.	6.00c.
Brass, heavy	3.62½c.	4.25c.
Brass, light	2.87½c.	3.62½c.
Hvy. machine composition	5.75c.	6.25c.
No. 1 yel. brass turnings	4.87½c.	5.37½c.
No. 1 red brass or compos. turnings	5.25c.	5.75c.
Lead, heavy	3.37½c.	3.75c.
Zinc	2.37½c.	2.75c.
Cast aluminum	12.12½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.

Fabricated Structural Steel

Lettings in Fair Volume—New Projects Higher

STRUCTURAL steel awards, at 17,025 tons, compare with 19,900 tons last week. Bookings of size include 6950 tons for a bridge at Homestead, Pa., for the Allegheny County Authority, 2250 tons for a post office in the Bronx, New York, and 2200 tons for a bridge at Meredosia, Ill. New projects of 16,200 tons compare with 11,250 tons in the previous week and 9955 tons two weeks ago. With the bulk of inquiries for bridge work, the largest single job reported is 3000 tons for a plant at Indianapolis for the Chevrolet Motor Co. Plate awards call for 4200 tons, with 11,650 tons pending. Bookings of sheet piling total 3750 tons and new projects of 6400 tons are under consideration. Contracts for structural steel work in September totaled 86,150 tons, compared with 73,378 tons in August and 61,150 tons in July. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

New York, 2250 tons, post office in Bronx, to Bethlehem Fabricators, Inc.

Brooklyn, 290 tons, stage for Vitaphone Studios, to Harris Structural Steel Co.

Brooklyn, 410 tons, buildings, 11 and 12, Navy Yard, to F. M. Weaver & Co.

Mount Morris, N. Y., 110 tons, children's hospital, to F. L. Heughes & Co.

Pleasantville, N. J., 200 tons, Delilah Road extension, to Phoenix Bridge Co.

Homestead, Pa., 6950 tons, bridge for Allegheny County Authority, to American Bridge Co.

Pittston, Pa., 310 tons, breaker for Sullivan Trail Coal Co., to Weatherly Steel Co.

Middleville, N. Y., 175 tons, State highway job, to McClintic-Marshall Corpn.

Champion, Pa., 140 tons, Pittsburgh Coal Co. carbonizer building, to McClintic-Marshall Corpn.

Kenilworth, Pa., 110 tons, State highway bridge, to Shoemaker Bridge Co.

THE SOUTH

Augusta, Ga., 250 tons, gates, to Virginia Bridge & Iron Co.

CENTRAL STATES

Rittman, Ohio, 200 tons, building for Ohio Boxboard Co., to Burger Iron Co.

Shaker Heights, Ohio, 110 tons, Kinslee Theater, to Fort Pitt Bridge Works Co.

Danville, Ill., 160 tons, State highway bridge, to Worden-Allen Co.

Peoria, Ill., 355 tons, building for Caterpillar Tractor Co., to an unnamed bidder.

Chicago, 130 tons, bridge section, to Zieber Steel Co.

Meredosia, Ill., 2200 tons, bridge, to American Bridge Co.

Kansas City, Mo., 165 tons, discharge pipe and fittings for Government building, to Maynard Electric Steel Casting Co.

Streator, Ill., 250 tons, warehouse for Owens-Illinois Glass Co., to Ingalls Iron Works Co.

North Platte, Neb., 300 tons, penstocks, to Allis-Chalmers Mfg. Co.

WESTERN STATES

Lincoln County, Colo., 110 tons, bridge, to American Bridge Co.

Arapahoe County, Colo., 200 tons, bridge, to American Bridge Co.

State of Colorado, 396 tons, bridges in six counties, to unnamed bidders.

Boulder City, Nev., 200 tons, Specifications 691-D and 699-D, to unnamed bidders.

State of Wyoming, 248 tons, bridges in four counties, to unnamed bidders.

Oakland, Cal., 100 tons, Santa Fe freight depot, to Moore Dry Dock Co.

Los Angeles, 130 tons, cranes for Department of Water and Power, to Harnischfeger Sales Corpn.

Los Angeles, 600 tons, crafts building, to Virginia Bridge & Iron Co.

Tenino, Wash., 175 tons, underpass, to Virginia Bridge & Iron Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 450 tons, Corpus Christi Church.

Schenectady, N. Y., 500 tons, addition to Maqua Co. plant.

Palmerton, Pa., 900 tons, New Jersey Zinc Co. furnace building extension.

State of Pennsylvania, 450 tons, highway projects.

Bound Brook, N. J., 100 tons, warehouse for Sherwin-Williams Co.

THE SOUTH

Butler, Ky., 542 tons, Pendleton County bridge. Lackawanna Steel Construction Co. low bidder.

State of Texas, 1850 tons, bridges.

Houston, Tex., 525 tons, bridge.

State of Oklahoma, 450 tons, bridges.

Konawa, Okla., 825 tons, bridge.

CENTRAL STATES

State of Michigan, 400 tons, grade crossing elimination.

Dearborn, Mich., 390 tons, coke oven foundations for Ford Motor Co.

Monroeville, Ohio, 195 tons, highway bridge. Bightler & Hussy, Columbus, low bidder.

Chicago, 550 tons, Eighty-seventh Street bridge for Nickel Plate and Chicago & Western Indiana Railroads.

Chicago, 265 tons, Twelfth Street bridge for Indiana Belt Line.

Peoria, Ill., 450 tons, addition to Caterpillar Tractor Company's plant.

Peoria, 350 tons, Illinois River lock.

Merom, Ind., 550 tons, bridge; general contract awarded to M. M. Rabbit Construction Co., Toledo.

Indianapolis, 3000 tons, Chevrolet Motor Co. body plant.

State of Iowa, 1500 tons, highway bridges.

Des Moines, Iowa, 1000 tons, viaduct.

Ruthven, Iowa, 200 tons, bridge.

State of Nebraska, 400 tons, highway bridges.

WESTERN STATES

Parco, Wyo., 100 tons, warehouse at Seminole dam; bids under advisement.

Los Angeles, 250 tons, tunnel ribs for Metropolitan Water District. Specification 131; bids opened Sept. 30.

Los Angeles, 100 tons, movable tunnel forms for Metropolitan Water District, Pennsylvania Iron & Steel Co., low bidder.

Whittier, Cal., 100 tons, post office; general contract awarded.

Multnomah County, Ore., 551 tons, State bridge over Eagle Creek on Columbia highway; bids Oct. 9.

FABRICATED PLATES

AWARDS

Heyworth, Ill., 450 tons, 118,000 bbl. tank for Texas Empire Pipe Line Co., to Chicago Bridge & Iron Works.

Wilmington, Ill., 1325 tons, three 118,000 bbl. tanks for Texas Empire Pipe Line Co., to Petroleum Iron Works.

Oakland, Cal., 1700 tons, 20 and 24-in. welded sheet steel pipe for East Bay Municipal Utility District, to Steel Tank & Pipe Co.

Denver, 100 tons, four high pressure gates for Rye Patch dam, to Commercial Iron Works.

Denver, 200 tons, three high pressure gates for Pine View dam, to Hardie-Tynes Mfg. Co.

Fort Peck, Mont., 120 tons, back liners, to Goodman Mfg. Co.

Mahukona, T. H., 300 tons, pipe line, to an unnamed bidder.

NEW PROJECTS

Louisville, Ky., 300 tons, dredge for United States Engineer.

Denver, 900 tons, five steel siphons on South Boulder diversion conduit; bids Oct. 7.

Arcadia, Cal., 120 tons, 16-in. welded pipe for water system improvements; bids opened Oct. 1.

Los Angeles, 10,632 tons, 130-in. pipe on Colorado River aqueduct, alternates on concrete pipe; bids Oct. 24.

SHEET PILING

AWARDS

Cap au Gris, Mo., 3750 tons, locks, to Inland Steel Co.

NEW PROJECTS

Boston, 4000 tons, bids to be asked soon.

St. Paul, 1200 tons, river wall; funds allotted.

Peoria, Ill., 1200 tons, locks on Illinois River.

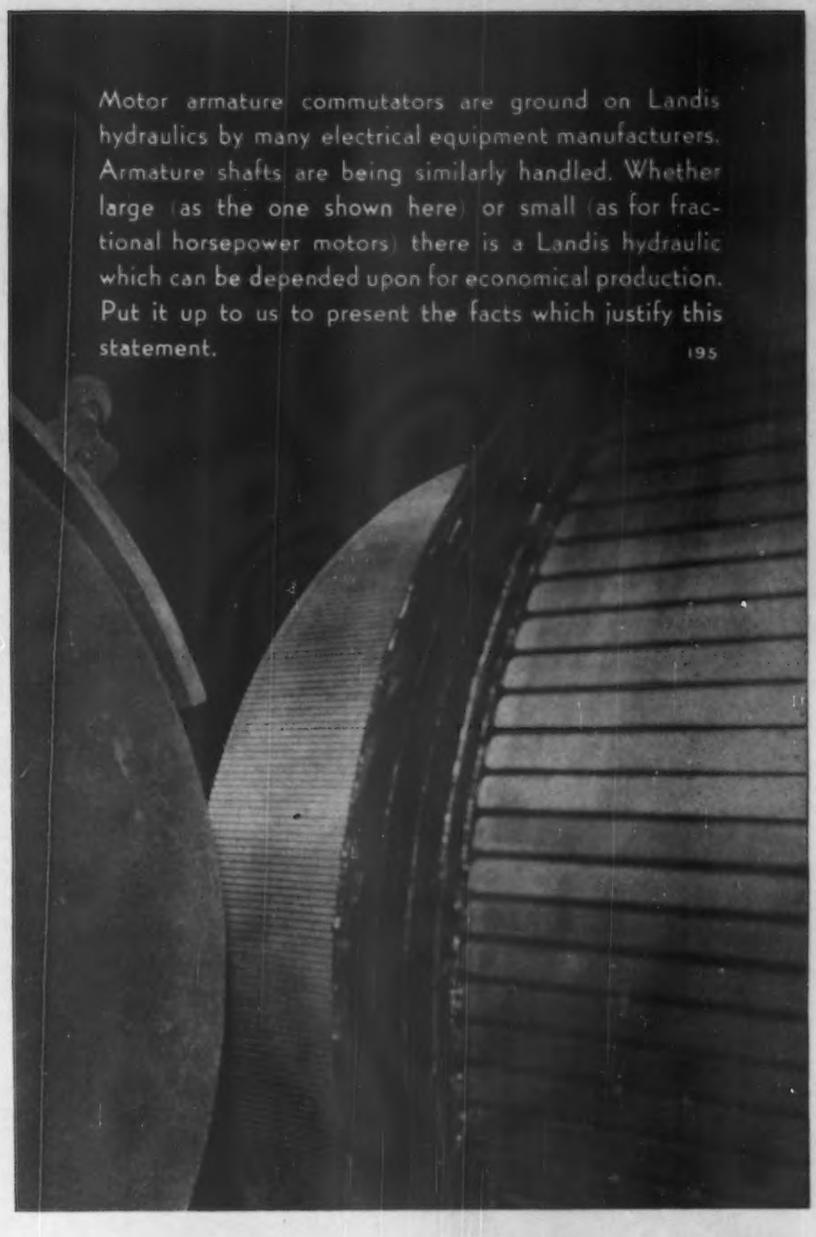
Further Changes in Republic Personnel

Several changes in personnel of the Republic Steel Corpn. have followed the merger of the Corrigan, McKinney Steel Co., with Republic. Donald B. Gillies, president of Corrigan, McKinney, has been made a vice-president. That he would become a director and executive officer was previously announced. This is the only change in the executive staff.

Henry T. Harrison, general manager and director of Corrigan, McKinney, will not be affiliated with the new Republic organization, having tendered his resignation effective Sept. 30. He has been the operating head of Corrigan, McKinney since its steel works were built. Frank F. Chiles, who has been manager of bar sales of the Corrigan, McKinney Co., has been appointed assistant manager of sales of bar products of the Republic Corpn. under W. F. Vosmer, the head of that department. Mr. Chiles has had charge of bar sales of the Corrigan, McKinney Co. for a number of years and was previously connected with the Cleveland sales office of the Carnegie Steel Co. The force in the Corrigan, McKinney bar sales department is being absorbed in the Republic bar sales organization.

The duties of C. A. Ilgenfritz, formerly director of purchases, have been broadened and he has been named as manager of purchases and raw materials. He will also look after leases, sale and purchase of properties, scheduling and all other matters pertaining to raw materials.

The Republic personnel is: T. M. Girdler, chairman of the board and president; R. J. Wysor, executive vice-president and general manager; Myron A. Wick, vice-president; Donald B. Gillies, vice-president; N. J. Clarke, vice-president in charge of sales; C. M. White, vice-president in charge of operations; W. W. Hancock, secretary-treasurer, and P. F. Boyer, comptroller.


Motor armature commutators are ground on Landis hydraulics by many electrical equipment manufacturers. Armature shafts are being similarly handled. Whether large (as the one shown here) or small (as for fractional horsepower motors) there is a Landis hydraulic which can be depended upon for economical production. Put it up to us to present the facts which justify this statement.
195

LANDIS TOOL CO.
WAYNESBORO, PA.

Cast Iron Pipe

Woodbridge, N. J., has taken bids on 100 tons, for sewage disposal plant.

Hartford, Conn., closed bids Oct. 1 on 100 tons, for sewage disposal plant.

Concord, Mass., plans 8-in. for replacements in present water lines. Cost about $17,500. Financing is being arranged through Federal aid.

Gulf Water Supply District, Corpus Christi, Tex., care of H. L. Atkinson, Beeville, Tex., chairman, plans pipe lines for water supply to group of communities in this district, from source of water near New Braunfels, Tex., to Corpus Christi, including 145 miles of 36-in. and 40 miles of 24-in. for trunk line, with connecting lines to Corpus Christi, Beeville, Falls City, Kenedy, Poth, Floresville, Taft and other municipalities. Distributing lines will be installed in different communities. Cost about $5,000,000. Financing is being arranged through Federal aid. G. D. Macy, 115 Dewey Place, San Antonio, Tex., is consulting engineer.

Mabton, Wash., closes bids Oct. 7 on 424 tons of 4 to 8-in. for water supply; also for deep-well turbine pumping units and other waterworks equipment.

Sheldon, Mo., plans pipe lines for water system; also elevated steel tank and tower and other waterworks installation. Cost about $35,000. Financing is being arranged through Federal aid. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Union, W. Va., asks bids until Oct. 7 for pipe for water supply and other waterworks installation. J. E. Settle, Security Bank and Trust Building, Charleston, W. Va., is consulting engineer.

Quartermaster, Army and Navy General Hospital, Hot Springs, Ark., asks bids until Oct. 11 for 1704 ft. of 4 and 6-in.; also bends, tees, valves and other fittings (Circular 5).

DuQuoin, Ill., will open bids Oct. 17 for waterworks improvements to cost about $266,000. Russel & Axton, St. Louis, are engineers.

Forsyth, Ga., plans about 2¼ miles of various sizes for water system; also equipment for new filtration plant and other waterworks installation. Cost about $55,000. Financing is being arranged through Federal aid. Robert & Co., Inc., Bona Allen Building, Atlanta, Ga., is consulting engineer.

Longview, Tex., plans about 20 miles 16 and 18-in. for main trunk line for water system. Fund of $450,000 is being arranged through Federal aid for this and other waterworks installation. H. L. Thackwell, Longview, is chief engineer; Mayers, Noyes & Forrest, Longview, are consulting engineers.

Salem, Ore., plans purchase of large quantity of various sized pipe for water supply. Surveys have been authorized for development of new water source, 6,000,000-gal. reservoir and other improvements and extensions. Cost over $300,000. Stevens & Koon, Spalding Building, Portland, are consulting engineers.

Hickman, Neb., plans pipe lines for water supply; also other waterworks installation. Cost about $26,600. Financing is being arranged through Federal aid. Hennimsen Engineering Co., Union State Bank Building, Omaha, Neb., is consulting engineer.

Pilot Grove, Mo., will take bids soon for pipe for water system; also for elevated steel tank and tower, and other waterworks equipment. Cost about $37,000. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Willamina, Ore., will take bids Oct. 10 on about 200 tons of 4-in.

Railroad Equipment

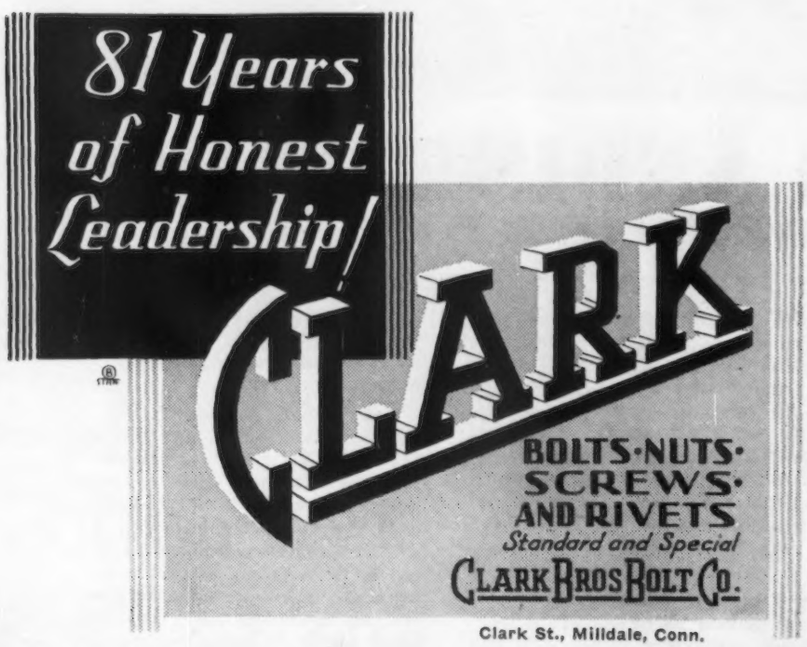
Temiskaming & Northern Ontario has ordered two 4-8-4 type passenger locomotives from Canadian Locomotive Co., Ltd.

Royal State Railways of Siam have asked for bids on eight Mikado 2 type locomotives and two Garratt locomotives.

Norfolk & Western plans to build 500 all-steel hopper car bodies in Roanoke, Va., shops.

The Chicago, Burlington & Quincy has ordered two stainless steel trains of the "Zephyr" type from the Edward G. Budd Mfg. Co.

Pennsylvania Railroad has ordered from Timken Roller Bearing Co. roller bearings to equip all axles of tenders of eight steam locomotives. Three weeks ago Pennsylvania placed order for Timken bearings and boxes to equip engine trucks and trailer trucks of these locomotives. Application will be made at road's Altoona, Pa., shops.



Clark St., Milldale, Conn.

RAILS AND TRACK SUPPLIES

Norfolk & Western will take bids Oct. 16 on 10,000 tons of rails with necessary accessories.

Wheeling & Lake Erie has placed 2000 tons of rails with Carnegie-Illinois Steel Corpn.

Gulf, Mobile & Northern has applied to Interstate Commerce Commission for authority to borrow PWA funds to purchase 4030 tons of 90-lb. rails.

Iron and Steel Electrical Engineers' Meeting

(CONTINUED FROM PAGE 39)

hearty and prolonged applause from the large audience to which he spoke.

Speaking on the subject "Absorption of Steel in Federal Projects," Edward H. Foley, director of the legal division of PWA, said that steel and allied industries will receive business to the extent of one billion dollars as the PWA program is carried through. A large portion of this will be spent directly for iron and steel; a good percentage for machinery and transportation equipment in which iron and steel is used; and some for non-ferrous metals, their products, and miscellaneous items.

Mr. Foley spoke as a substitute for the scheduled speaker, Col. H. B. Hackett, assistant to Secretary Ickes, who was detained in Washington. N. J. Clarke, vice-president of the Republic Steel Corpn., presided and introduced the speaker.

The technical sessions were opened on Tuesday morning, with G. R. Carroll, newly elected president of the association, in the chair. Mr. Carroll is electrical superintendent of the Aliquippa works of the Jones and Laughlin Steel Corpn.

At this session Walter H. Burr, electrical and mechanical superintendent of the Lukens Steel Co., presented the report of the Electrical Developments Committee, showing that there are now installed 2,840,000 horsepower in electric motors driving main rolls. A fact of particular interest which serves to exemplify the well-known trend in new mill construction is that of 53 main roll motors purchased in 1934 all but six were in connection with strip or sheet mills.

At this same session two papers on strip mill runout table and coiler drives were presented, one by G. A. Caldwell and S. F. Henderson of the Westinghouse Co., and the other by W. B. Snyder and L. E. Hildebrand of the General Electric Co. Both emphasized the importance of a careful analysis of the conditions to be met, before any selection of motors, motor-generators or control is made. On one of the mills now under construction over 900 motors ranging from 1 to 10 hp. each will be used on the table

rolls and coilers. The total capacity of the motors on these drives on a single mill may reach 2500 or 3000 hp., and the cost of the electrical equipment alone may be as much as $300,000.

Strip Mills

Mr. Stephen Badlam presented "A Review of Sheet, Tin and Strip Mills," continuing the valuable historical treatises he has delivered at previous meetings. According to his figures there are now in operation or under construction 18 broad strip mills. He estimated that a total of 28 such mills would be capable of producing all the flat rolled tonnage of the country which can possibly be rolled on this type of mill. In other words, if practically all two- and three-high sheet and tin mills were eliminated, 28 continuous mills could supply the country's demands.

One of the most interesting papers of the convention was that by C. L. McGranahan, superintendent of Inland's 76 in. hot strip mill, on "The Flat Rolling of Steel." Mr. McGranahan said that the buyer's market which has prevailed for the last six years has been so exacting that today an acceptable hot rolled sheet must practically equal a blued cold rolled sheet in surface and flatness. To produce this sheet all conditions must be very carefully controlled. The slabs must be properly selected and sufficient chipping done to insure elimination of seams. For best surface the slabs should be allowed to cool after leaving the bloomer, and then be reheated, as this produces a scale which is easier to remove.

A slab which has been cross-rolled in the spreading stand is apt to have a better surface than one which goes straight through all stands. Cross-rolling tends to spread out and eradicate any lengthwise marks left on the slab by the blooming mill manipulators. Insofar as other physical characteristics are concerned, cross-rolling seems to be of no particular benefit. Following the spreader is the squeezer, and here great care must be exercised to prevent squeezing so much that the edges of the slab are upset. If they are, fishtails will form, with the consequent possibility of marking the finishing rolls.

The high-pressure water used in the scale-removing sprays must be relatively clean or surface marks will result. The condition of the surfaces of both working and backing-up rolls must be watched very carefully, and they must be changed frequently. The mill installation should provide for accomplishing this quickly.

The drafts taken on the different stands vary from as little as 10 per cent to as much as 60 per cent, depending on the product, the condition of the rolls, the tonnage to be rolled, and other factors.

Some trouble is experienced with telescoping of the coils in the coilers. It seems impossible to eliminate the telescoping, but if the strip is held taut between coiler and finishing stand the difficulties are minimized. Some mills have coilers close to the finishing stand; on others they are several hundred feet distant. Each arrangement has advantages. If considerable annealing in the coil is desired, the coilers close to the mill are better, permitting the strip to be coiled very hot.

A question sometimes asked is whether the roughing stands should be built as universal mills, or with the edgers as separate stands at a distance from them. Most installations have the universal stands. The vertical rolls then act as guides for the horizontal, but the slab must be long enough to reach from the vertical to the horizontal rolls, or the slab may stop between the two, resulting in a troublesome cobble.

The production of a commercially acceptable hot strip requires the closest kind of cooperation from every man in the mill, and with this cooperation, and suitable equipment, excellent results can be obtained.

R. J. Wean, president of Wean Engineering Co., advocated the cold working of steel in a so-called "processing machine," whenever non-ageing deep drawing qualities are required. This processing induces a state of "cold plasticity" in which the metal can be subjected to very severe drawing operations without resulting stretcher strains or surface blemishes.

At the Combustion Engineering Division session papers were presented on various phases of open hearth practice, and on the bright annealing of strip and sheets in furnaces with controlled atmospheres.

The Mechanical and Lubrication Engineering Division session was devoted principally to a consideration of roll-neck bearings. J. H. Hitchcock of the Morgan Construction Co., stated that with the precision-made oil-flooded sleeve bearing a friction coefficient of 0.001 to 0.003 is obtained, resulting in power savings of 45 per cent to 60 per cent, when compared to grease lubricated brass bearings. Representatives of the General Electric Co., the Westinghouse Co., and J. T. Ryerson & Sons said that the past three years had seen a gradual increase in the range of application of non-metallic composition bearings, until now they are in use on practically every type of mill except the two-high hot sheet mill.

At the session of the Welding Engineering Division some very interesting motion pictures were shown by the General Electric Co. These pictures were taken at an exposure rate of about 1000 per second. When projected at 10 to 12 exposures per second the action of the arc was shown very clearly. The difference between the "magnetic blow" effect of the a-c arc and that of the d-c was quite apparent.

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50 Types
All Sizes
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YOU would consider an engineer dangerously negligent who built a bridge just strong enough to stand up under a normal load. No prudent man would erect a plant on foundations that did not have a wide "safety factor," strength to support two or three times the estimated weight of the building. It is equally unsound to supply workmen with wrenches that have not sufficient strength to be safely used *under all conditions*, to use inferior wrenches at the risk of hands, arms and even lives.

ARMSTRONG Wrenches have a wide "safety factor"—an extra strength derived from tested steel, superior designs, advanced methods of manufacture. They are drop-forged from special steel that gives both stiffness and tensile strength. Jaws are accurately milled. Each ARMSTRONG Wrench is carefully inspected, is pronounced a flawless tool before it is offered for sale, a *safe* tool certain to take a positive grip and hold it. The extra strength of ARMSTRONG Wrenches enables them to stand up under all manner of abuse, to give long dependable service.

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"The Tool Holder People"
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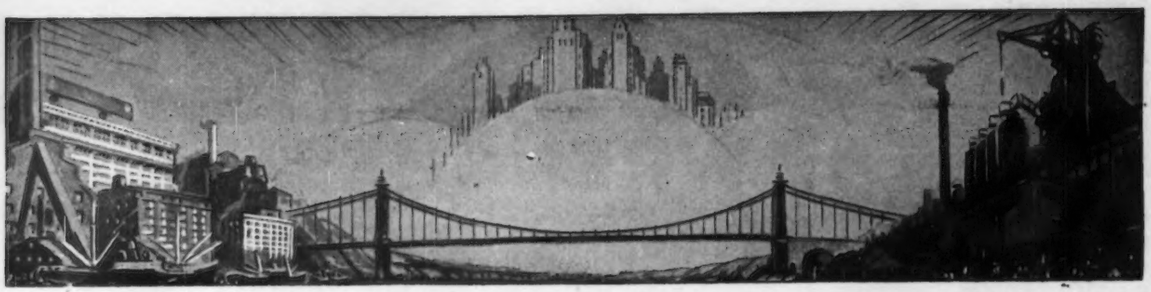


Plant Expansion and Equipment Buying

Heavy Inquiries Feature Machine Tool Market—Orders Are in Fair Volume

MACHINE tool builders are occupied principally with inquiries received at or immediately following the Cleveland show. In some instances, estimating departments are literally swamped with work, and executives are encouraged by the fact that the intentions of buyers are apparently serious. Another favorable aspect of the situation is the wide diversity of sources from which prospective business is coming. Large and small buyers are represented and every conceivable type of manufacturing activity is being heard from.

A large manufacturer of refrigerator cabinets has ordered 10 large presses from a Cleveland maker. The Chevrolet Motor Co. is buying tool room equipment for its new transmission plant at Saginaw, Mich., and has already placed a number of orders. In the railroad field, the Milwaukee Road is inquiring for tools, and the International Harvester Co. has a list out for its West Pullman, Ill., works.

NORTH ATLANTIC

United States Smelting, Refining & Mining Co., 57 William Street, New York, has authorized addition to concentration mill at Midvale, Utah, increasing plant capacity to 2000 tons daily. Unit is scheduled for completion by close of year. Cost about $200,000 with machinery.

Metal Specialty Co., New York, manufacturer of stamped metal products, has leased space in 136 West Twenty-first Street for new plant.

Handy & Harman, 82 Fulton Street, New York, refiners of gold, silver, platinum, etc., have asked bids on general contract for new one-story plant at Toronto, Ont., for melting, rolling and annealing of precious metals in sheet and wire form. Cost about $50,000 with equipment. New unit will be operated in name of Handy & Harman of Canada, Ltd. Page & Steele, 20 St. Clair Street, West, Toronto, are architects.

Board of Education, Middletown, N. Y., plans manual training equipment in new three-story high school on Wisner Avenue. Fund of about $800,000 is being arranged through Federal aid. R. R. Graham, 25 Prospect Street, is architect.

Porcelain Metals, Inc., 58 Sedgwick Avenue, Brooklyn, manufacturer of enameled iron signs and kindred metal-enameled goods, has leased one-story building on tract of 80,000 sq. ft., at Long Island City, for new plant.

Sunshine Mining Co., 40 Wall Street, New York, operating silver mining properties, is planning addition to concentration mill for considerable increase in present output. Cost over $75,000 with equipment.

Newmont Mining Corpn., 14 Wall Street, New York, is interested in project to develop Zeibright mining properties in Bear Valley district, near Nevada City, Cal., for gold production. A new mill will be erected for handling about 400 tons of crude ore per day, in addition to installation of general mining machinery, elevating and conveying, and other equipment. Cost over $250,000 with equipment.

Board of Education, Watervliet, N. Y., plans manual training department in new three-story high school. Cost about $600,000 with equipment. Financing is being arranged through Federal aid. Solomon & Keis, 257 Broadway, Troy, N. Y., are mechanical engineers.

New York Revolving Portable Elevator Co., 908 State Street, North Bergen, N. J., has purchased local property, 48 x 134 ft., for expansion.

Kuhn & Jacob Moulding & Tool Co., 501 Prospect Street, Trenton, N. J., manufacturer of tools, metal molds, dies, etc., has arranged for purchase of two buildings and adjoining land on Ingham Avenue, and will remodel for new plant. New boiler house will be built. Present works will be removed to new location and additional equipment installed to give employment to more than 100 persons. Cost over $30,000 with machinery.

Wilbur F. Bowers Foundry, Willow Grove Street, Hackettsown, N. J., manufacturer of iron castings, has begun erection of one-story building to replace a foundry unit, recently razed, to provide increased output.

F. & A. Lighting Fixture Co., Philadelphia, recently organized, has leased four-story factory at 328-32 Noble Street for plant.

Caloric Furnace Co., Trenton and Tioga Streets, Philadelphia, manufacturer of furnaces and heating equipment, parts, etc., has acquired former plant of Freed Heater Co., Oaks district, comprising group of one-story buildings on 4-acre tract, and will remodel for new works.

Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 11 for one motor-driven testing machine for Philadelphia Navy Yard (Schedule 6095).

S. J. Wagner, Sinking Spring, Pa., has purchased from James R. Wotherspoon, Inc., plant of Bell-Mattern Foundry, Inc., manufacturer of stoves and iron castings. Mr. Wagner has had many years' experience in the gray iron foundry business and will manufacture stoves and castings, similar to those made by his predecessor, under name of Sinking Spring Foundry Co.

Braun Gear Corpn., formerly at 1323 Gates Avenue, Brooklyn, has moved into its new plant at 1592 Atlantic Avenue, recently purchased, occupying more than twice its former floor space. Jacob J. Braun is president.

Light Electric Co., recently organized, has leased a building at 54 Springdale Avenue, Ampere, N. J., for manufacture of transformers. J. U. Light, formerly chief engineer of Newark Transformer Co., Newark, N. J., is head of new company.

NEW ENGLAND

Atlantic Wire Co., Church Street, Branford, Conn., has let general contract to Mariani Construction Co., 222 Forbes Avenue, New Haven, Conn., for two additions, two-stories, 40 x 130 ft., and one-story, 30 x 200 ft. Cost over $85,000 with equipment. Leo F. Caproni, 742 Elm Street, New Haven, is architect and engineer.

Bridgeport Brass Co., Housatonic Avenue, Bridgeport, Conn., has let general contract to Hewlett Construction Co., 886 Main Street, for one-story addition, 52 x 150 ft., with extension 40 x 60 ft. Cost over $45,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, is architect and engineer.

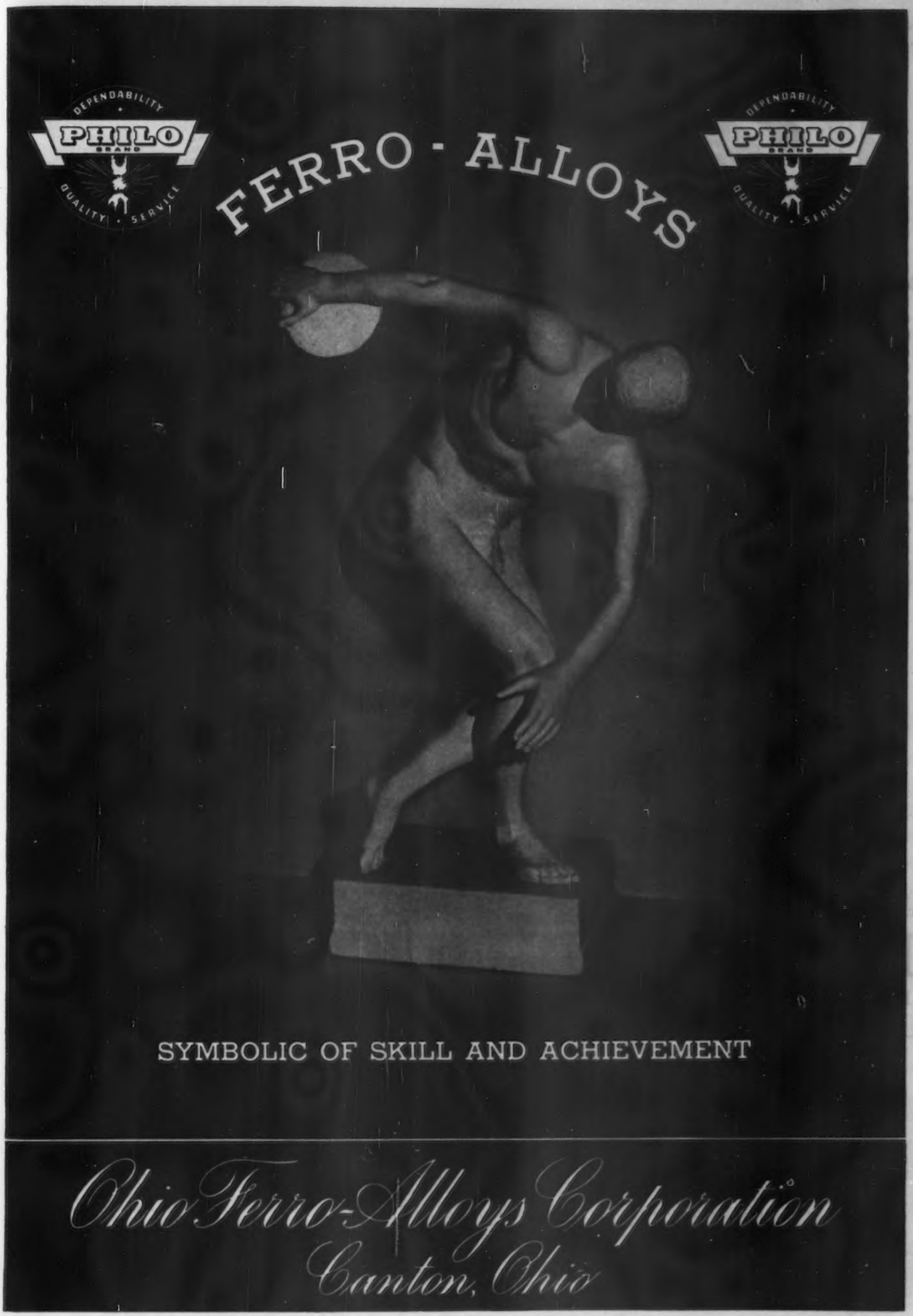
Department of Mental Diseases, State House, Boston, asks bids until Oct. 9 for motors, starters, safety switches and other equipment for shop building at Gardner State Colony, East Gardner, Mass.

School Board, Uxbridge, Mass., plans manual training department in new two-story and basement high school. Cost about $200,000 with equipment. Financing is being arranged through Federal aid. S. W. Haynes & Associates, 336 Main Street, Fitchburg, Mass., are architects.

New England Sales & Mfg. Corpn., Boston, has been organized by Alfred J. LaCroix and Arthur R. Dinn, 319 Ashmont Avenue, to manufacture fire and traffic signal devices and equipment.

BUFFALO DISTRICT

Gwinn Aircar Co., Inc., Buffalo, recently organized by Joseph M. Gwinn, Jr., and associates, has leased space in plant of Atterbury Motor Car Co., Elmwood and Hertel Avenues, for preliminary plant for manufacture of new small type commercial airplanes, and will later establish large plant for commercial production, including parts manufacture and assembling. Mr. Gwinn was formerly connected with Consolidated Aircraft Corpn., Buffalo, which recently transferred operations to San Diego, and will be president of new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France to America in four days! . . . the "Normandie," De Luxe French Liner, set a new all-time record on her maiden trip from Le Havre to New York.

ULTRA-CUT STEEL

is the modern screw stock that keeps in tempo with the times. Today, there is a premium on *speed* as it puts extra profits in production. And Ultra-Cut "has what it takes" to boost machine output without sacrifice of quality. With faster feed, goes finer finish, increased tool life, and lower cost per part. Try Ultra-Cut Steel on your automatic screw machines, and you will gain a new conception of MACHINABILITY.

The shop foreman said this 7/8" jack screw caused "plenty trouble" in machining until Ultra-Cut Steel was put on the job. Then using a surface speed of 80' per min., and .0135 feed on drills, the time per part was reduced from 27 to 16 seconds with 70% longer tool life and vastly superior finish than former stock permitted. Read about other Ultra-Cut records in Folder No. 3-A.

Cold Drawn Bars and Shafting • Free-Cutting Screw Stock • Special Sections • Alloy Steels

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company; Clinton P. Warner, also previously identified with Consolidated company, will be an official of new company, as will Jack Sanderson, president of Fleet Aircraft of Canada, Ltd.

Trico Products Corpn., 817 Washington Street, Buffalo, manufacturer of automobile equipment and accessories, has asked bids on general contract for two-story and basement addition, 50 x 100 ft. Cost over $40,000 with equipment. W. R. Jewel, 33 Frontenac Avenue, is engineer.

Board of Education, City Hall, Buffalo, James Storer, secretary, asks bids until Oct. 22 for manual training equipment, metal chairs, metal tablet arm chairs, metal stools, metal cabinets, metal lockers, laboratory furniture and other equipment for school No. 37. Bureau of School Architecture, City Hall, is in charge.

SOUTH ATLANTIC

Fellsmere Sugar Co., Fellsmere, Fla., has plans for new cane sugar refinery, for initial capacity of about 100,000 lb. in 12 hr. Costs close to $125,000 with machinery. Storage and distributing buildings will be erected.

State Board of Control, Eleemosynary Institutions, State Capitol Building, Atlanta, Ga., plans new central steam-electric generating plant for electric light, heat and power service at State buildings at Milledgeville, Ga. Cost about $350,000 with boilers and accessories, generator units, pumping machinery, switchboard equipment, etc. Financing is being arranged through Federal aid. Comer Turley, Lindale, Ga., will be engineer in charge of construction.

City Commission, Daytona Beach, Fla., asked bids until Oct. 11 for municipal waterworks equipment, including three main pumping units, one of 2100 gal. per min., and two of 1400 gal. per min. capacity, service pumps, wash water pumps and accessories; two 200,000-gal. elevated steel tanks and towers; complete equipment for water-softening plant of 4,000,000 gal. per day rating, including mixing equipment, chemical apparatus, aerators, etc. Robert & Co., Inc., Atlanta, Ga., is consulting engineer.

City Council, Rocky Mount, N. C., plans rural electrification project, using municipal electric power plant as source of supply, including transmission and distributing lines, power substation and service facilities. A bond issue of $87,000 has been authorized for project.

WESTERN PA. DIST.

American Oil Co., Grant Building, Pittsburgh, with headquarters in American Building, Baltimore, has let general contract to P-K Construction Co., Inc., Fulton Building, for new bulk oil storage and distributing plant at Hays, Pa., where about 11 acres was recently acquired. It will comprise one and two-story buildings, with pumping station, battery of steel tanks and other facilities for river and rail service. Cost close to $300,000 with equipment.

Parkersburg Rig & Reel Co., Parkersburg, W. Va., manufacturer of oil rigs and oil well equipment, has let general contract to Homer R. Peterson, M. & M. Building, Houston, Tex., for one-story addition, 40 x 80 ft., to branch plant at Houston. Cost about $25,000 with equipment.

Penn Township School District, Penn Township, Allegheny County, care of John H. Phillips, Wabash Building, Pittsburgh, architect, plans manual training department in new three-story high school, for which bids have been asked on general contract. Cost about $325,000.

OHIO AND INDIANA

Heller Brothers Co., Newcomerstown, Ohio, manufacturer of files, rasps, etc., has plans for one-story addition, 47 x 180 ft., with extension, 30 x 70 ft., for file manufacture under a new process. Cost close to $50,000 with equipment.

Weatherhead Co., 620 Frankfort Avenue, Cleveland, manufacturer of automobile equipment and accessories, has purchased adjoining five-story building, 72 x 200 ft., and will improve for expansion. A. J. Weatherhead is president.

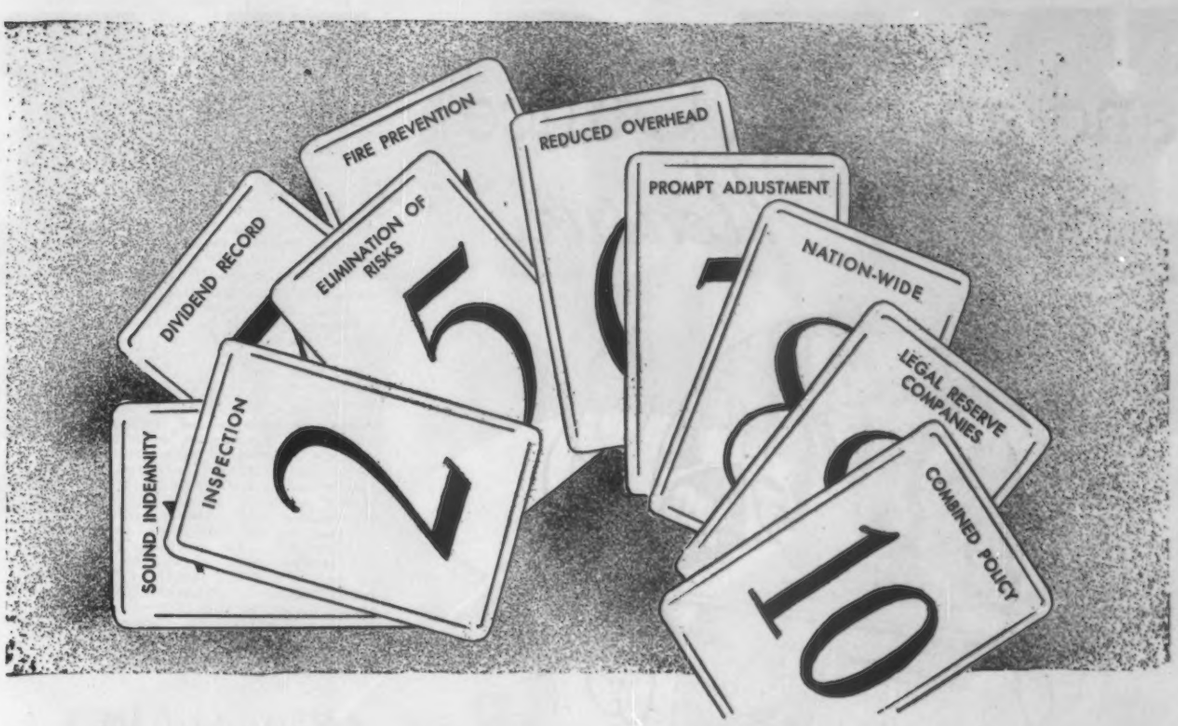
Palmer Co., St. Bernard, Cincinnati, manufacturer of precision equipment, thermometers, etc., has plans for new two-story plant unit, 50 x 150 ft., for which bids will be asked soon on general contract. Cost about $45,000 with equipment. J. C. Grunkemeyer and C. W. Sullivan, 3717 Eastern Avenue, Cincinnati, are architects.

Foster Mfg. Co., Elyria, Ohio, C. H. Foster, North Maple Street, president, has awarded general contract to Henry Heidrich, Elyria, for one-story plant, 50 x 100 ft., for manufacturer of electric-operated massage machines, parts and kindred apparatus. Cost about $35,000 with equipment.

City Council, Piqua, Ohio, plans new power transmission line from city limits to Troy, Ohio, for electric power service, including power substation facilities. Cost about $35,000. Financing is being arranged.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Oct. 7 for power plant, including engine with generator drive, bilge pump, etc. (Circular 216), retainer assemblies (Circular 206); until Oct. 8, 69 machinists' bench vises, 4½-in. stationary jaw, swivel base (Circular 224), 2450 adjustable wrenches (Circular 218); until Oct. 9, ignition switch assemblies (Circular 225); until Oct. 10, 500 tow target release assemblies, 600 tow target release cable cones, 600 tow target release rope cones and 4000 tow target lead rope assemblies (Circular 211); until Oct. 11, one motor-driven vertical shaper (Circular 219); until Oct. 14, 275 hand tube benders (Circular 211), ignition cable markers (Circular 213).

City Council, Peru, Ind., plans exten-



CARDS ON THE TABLE, FACE UP

In buying fire insurance, you are entitled to *know* beforehand the quality of coverage offered.

This has always been the IRM method:

To inspect properties carefully.

To accept only those that "make the grade."

Then to make them still better by offering suggestions that will reduce fire risks.

We don't stop there. When our fire-prevention engineers inspect the property and recommend ways of eliminating fire hazards, the consequent savings are passed along to the policyholder. Frequent inspections thereafter continue to keep the risks—and the costs—down.

Since your insurance costs are a considerable item, it is common sense to buy carefully. Remember that the *annual* return to our policyholders during our fourteen years as a group has been 25% of their premiums.

Our inspection of your properties may reveal ways for us to cut your initial costs—quite apart from the dividend earnings thereafter. We shall be glad to go over your requirements with you, if you will write us.

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Mill Owners Mutual Fire Insurance Co. of Iowa, Des Moines, Iowa
Millers Mutual Fire Insurance Assoc. of Illinois, Alton, Ill.
Millers Mutual Fire Insurance Co., Fort Worth, Texas
Millers Mutual Fire Insurance Co., Harrisburg, Pa.
National Retailers Mutual Insurance Co., Chicago, Ill.
Northwestern Mutual Fire Assoc., Seattle, Wash.
Pennsylvania Lumbermen's Mutual Fire Insurance Co., Phila., Pa.
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-and an Extra Ounce *for Good Measure*

Seventy years ago, in Nathaniel Jenkins' time, storekeepers commonly gave customers a little more than they paid for. "Good measure", it was called. But, actually, that "extra-measure" was added to please and hold buyers.

In making his revolutionary composition disc valves, Nathaniel Jenkins applied the store-keepers' secret of holding customers. He made his valves better than good enough. He put into them an extra-measure of quality that made a "Jenkins" last longer and work better than a buyer would expect. It was good business. The fame of Jenkins Valves spread to the far corners of the world. Buyers became permanent customers who would have no other make.

Our reputation is built upon this "extra measure of quality" policy established by Nathaniel Jenkins over seventy years ago. Users, frequently writing us tributes such as: "I have been using your valves for the past 35 years and would rather have them at double the cost of any other," make us proud that we have never deviated from it. We are determined that Jenkins Valves shall always return to the buyer an extra-measure of efficient, economical service.

Jenkins Bros

JENKINS BROS., 80 White Street, New York, N. Y.; 510 Main Street, Bridgeport, Conn.; 524 Atlantic Avenue, Boston, Mass.; 133 N. Seventh Street, Philadelphia, Pa.; 822 Washington Blvd., Chicago, Ill.; JENKINS BROS., Ltd., Montreal, Canada; London, England.

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sions and improvements in municipal electric light and power plant, including new equipment. Cost about $32,000. Financing is being arranged. W. H. Long, mayor, is active in project.

Chevrolet Commercial Body Division, General Motors Corpn., 1100 West Henry Street, Indianapolis, has plans for new works on 1100-acre tract, occupied in part by present works, with main one-story unit, 600 x 1100 ft., and new power house adjoining. When completed, present plant will be razed and another unit of same size as noted will be built, providing total of about 500,000 sq. ft. floor space. Cost over $850,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer. R. S. Montgomery is local manager.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Oct. 18 for automobile parts (Circular 49).

Central Metal & Supply Co., 609 East Lombard Street, Baltimore, plumbing equipment and supplies, has let general contract to Carlstrand Engineering Co., 10 West Chase Street, for new one-story shop, 90 x 110 ft. Cost about $40,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until Oct. 11 for 28,000 ft. wire rope, 300 ft. wire towing rope, 3000 ft. plow steel wire rope, 1000 lb. galvanized steel seizing strand, 5000 lb. soft steel wire, 6000 lb. barbed wire, 12 1-ton chain hoists, one 10-ton chain hoist, one metal-melting furnace of 1000-lb. capacity, 48 tackle blocks, one wire stretcher with work extension table and complete with motor, tools and attachments, etc., 66, 500 lb. common wire nails, 5000 lb. galvanized wire finishing nails, 3000 lb. galvanized boat spikes, 11,400 ft. brass pipe, galvanized malleable iron pipe fittings, malleable iron unions, bronze and other gate valves, globe valves and other equipment (Schedule 3093).

Baltimore Pure Rye Distilling Co., Sollers Point Road, Dundalk, Baltimore, has let general contract to Engineering Contracting Corpn., 504½ St. Paul Street, for two-story bottling works. Cost about $40,000 with equipment. C. H. Osborne, 212 West Franklin Street, is consulting engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 8 for heavy-duty motor-driven engine lathe (Schedule 6041); until Oct. 11, two motor-driven pipe-threading, cutting and reaming machines (Schedule 6102), one metal-cutting hack saw (Schedule 6106), four steel boring bars, each 10 ft. long (Schedule 6109) for Norfolk, Va., Navy Yard; storage batteries and storage battery parts (Schedule 6046), 21,840 hand electric flashlights (Schedule 6063); until Oct. 15, fuses and fuse elements (Schedule 6070) for Eastern and Western yards; aluminum cartridge tanks and aluminum powder tanks for Iona Island, Portsmouth, and Eastern yards (Schedule 6064).

SOUTH CENTRAL

George T. Stagg Co., Frankfort, Ky., has awarded general contract to J. D. Jennings, 328 East Breck Street, Louisville, for seven-story addition to distillery for storage and distribution. Cost over $125,000 with equipment. Carl J. Kiefer, Schmidt Building, Cincinnati, is consulting engineer.

Tennessee Valley Authority, Knoxville, Tenn., engineering department, plans development of airport at Muscle Shoals, Ala., where about 240 acres has been selected, to include two steel hangar units with capacity for 20 airplanes, shops for repair and reconditioning, oil storage and distributing buildings and other field units. Fund of $250,000 is being arranged for buildings and equipment.

Carter Mfg. Co., Kansas Street, Memphis, Tenn., manufacturer of auto trailers and parts, winches and kindred heavy equipment, has acquired adjoining land, 150 x 215 ft., for one-story addition. Cost over $45,000 with equipment. Nathan A. Carter is president.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Oct. 10 for one gasoline-operated electric generating set for standby unit at Wheeler hydroelectric generating plant; until Oct. 14, lock gates, segmental valves and auxiliary equipment for lock at Pickwick Landing; until Oct. 15, three 15-ton gasoline locomotives for Pickwick Landing dam.

MICHIGAN DISTRICT

American Blower Corpn., 6000 Russell Street, Detroit, has asked bids on general contract for one-story plant unit, 120 x 440 ft., at Dearborn, Mich. Cost over $175,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

L. A. Young Spring & Wire Corpn., 9200 Russell Street, Detroit, has taken over factory at 187 Geary Street, Toronto, Ont., totaling about 30,000 sq. ft., floor space, for new branch plant, operated in name of L. A. Young Industries of Canada, Ltd. Manufacturing plant at Windsor, Ont., is being removed to new location, where production will be concentrated. Windsor works will be continued for parts division.

City Council, Albion, Mich., plans new municipal electric light and power plant, and electrical distributing system. Cost about $650,000. Financing is being arranged through Federal aid.

Board of Education, Battle Creek, Mich., plans manual training department in new three-story high school, for which bids

MOLY

. . . porosity's greatest enemy

THERE are times when whole batches of castings must be scrapped because of porosity. Many up-to-date foundrymen today look to Molybdenum to help them avert such loss-entailing crises. Doing so involves neither heavy added expense nor increased production difficulties. In fact, "Moly" usually saves its cost over and over.

The use of Moly requires no change in the mix — just add the small quantity prescribed by practice and the grain of the product becomes refined. And, instead of increasing machining difficulties, Moly actually diminishes them. Sounds too simple to be believable, doesn't it? Nevertheless, a comparative test will prove the claim as convincingly as was done in this actual instance:

A foundry, casting 12″-diameter pulleys into which a series of 2″ grooves was cut, found that, with a low enough carbon-and-silicon plain iron to eliminate porosity at the base of the grooves, shrinkage occurred in the center of the pulley. The problem was finally and simply solved by adding 1.00% Moly to the iron — which eliminated both the porosity and the shrinkage.

Foundrymen interested in Molybdenum developments will find a great deal of practical information in our book "*Molybdenum in Cast Iron* — 1934 *Supplement*." A simple request brings it to you without charge or obligation. Upon request we will also gladly put you on the mailing list of our periodical news-sheet "*The Moly Matrix*." . . . And, if at any time you are confronted with some puzzling casting problem, you are quite welcome to consult our metallurgists or to use our Detroit experimental laboratories. Climax Molybdenum Company, 500 Fifth Avenue, New York. (In Canada: Railway & Power Engineering Corp., Ltd.)

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Toledo Zenith

COKE

Foundry, Industrial and Domestic

Chicago Solvay

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Perry Toledo

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Zenith

All Lake Superior grades of

IRON ORE

By-product and Steam

COAL

Pickands, Mather & Co.

Cleveland - Chicago - Detroit - Erie - Toledo

Minneapolis - Duluth

will be asked soon on general contract. Cost about $200,000. A. B. Chanel, Battle Creek, is architect.

Chrysler Corpn., 341 Massachusetts Avenue, Detroit, has awarded general contract to Carter, Halls & Aldinger Co., Ltd., Toronto, for one-story addition, 100 x 240 ft., to Canadian branch plant at Windsor, Ont., operated in name of Chrysler Corpn., of Canada, Ltd. Cost close to $350,000 with equipment. Hutton & Souter, Piggott Building, Hamilton, Ont., are architects.

◀ MIDDLE WEST ▶

Acme Steel Co., 2840 South Archer Avenue, Chicago, manufacturer of steel hoops, steel box-strapping and kindred steel specialties, has asked bids on general contract for one-story addition to plant at Riverdale, 80 x 440 ft. Cost over $100,000 with equipment. Peter R. Hynes is company engineer in charge.

Diamond-T Motor Car Co., 4517 West Twenty-sixth Street, Chicago, manufacturer of motor trucks and parts, has asked bids on general contract for one-story addition, primarily for storage and distribution. Cost over $40,000 with equipment. Armstrong, Furst & Tilton, 11 South LaSalle Street, are architects.

Signal Officer, Sixth Corps Area, Chicago, asks bids until Oct. 18 for high-frequency radio transmitters and receivers (Circular 1).

Lehigh Briquetting Co., 322 North Fifth Street, Fargo, N. D., K. A. Loven, general manager, has plans for extensions and improvements in fuel briquette plant at Dickinson, N. D., to include new carbonizing machinery and other equipment. Cost about $300,000 with equipment. Financing in this amount has been arranged through RFC. Company plans early removal of main offices to plant site.

City Council, LaSalle, Ill., has plans for new municipal electric light and power plant and distributing system. Work is scheduled to begin soon. Cost about $750,000. Financing is being concluded through Federal aid. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

International Harvester Co. of America, Inc., 606 South Michigan Avenue, Chicago, has asked bids on general contract for one-story addition to motor truck plant at Fort Wayne, Ind. Cost about $130,000 with equipment. W. H. Kruger is company engineer in charge.

Board of Vocational Education, Antigo, Wis., has plans by Law, Law & Potter, architects, for vocational school addition costing $108,700, for which PWA grant of $48,915 has been allotted. Bids will be taken about Oct. 15. Orval Olsen is director of school.

Allis-Chalmers Mfg. Co., Milwaukee, which recently announced enlargement of farm combine division of works at La Porte, Ind., at cost of $175,000, will start work Oct. 15 on new stamping, shearing and cutting shop at plow and tillage tractor implement works, 172 x 300 ft., one-story sawtooth, costing about $150,000 with equipment. Fred J. Papenfuss is works manager at La Crosse.

Koller Tool & Die Co., Milwaukee, is completing transfer of plant from 2019 South Kinnickinnic Avenue, to two-story shop building at 1116 South First Street, acquired recently and remodeled. New building provides 12,000 sq. ft., against 8000 in former plant.

◀ SOUTHWEST ▶

Hyde Park Breweries Association, Inc., 2110 Salisbury Street, St. Louis, plans extensions and improvements in brewery plants, including modernization of present facilities and installation of new equipment. Cost over $200,000 with equipment.

Board of Education, Eighth and Harrison Streets, Topeka, Kan., plans manual training department in new two-story and basement junior high school in East Topeka. Cost about $380,000 with equipment. Financing is being arranged through Federal aid. Cuthbert & Suehrk, 735 Kansas Avenue, are architects; W. E. Glover, National Reserve Building, is associate architect. Frank Williamson, National Bank of Topeka Building, is mechanical engineer.

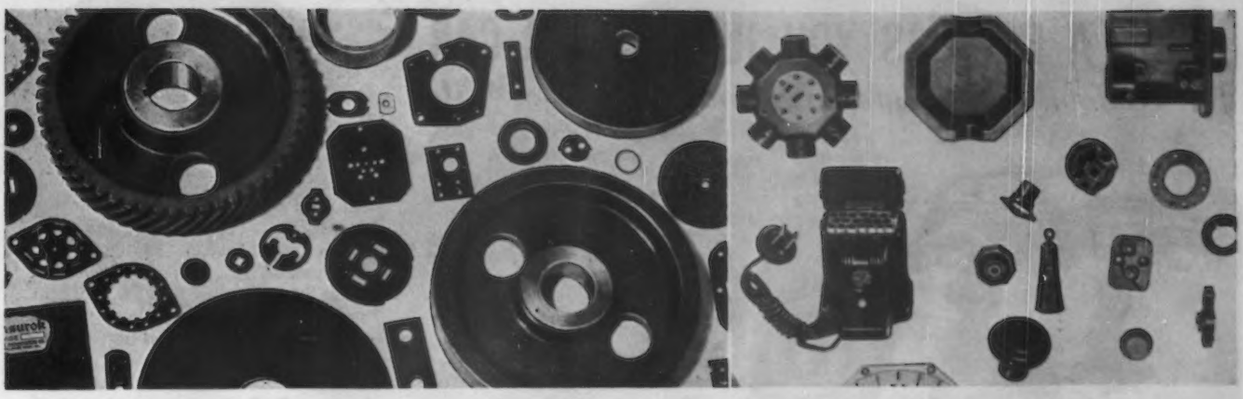
City Council, Alva, Okla., plans new municipal electric light and power plant, and electrical distributing system. Cost about $240,000. Financing is being arranged. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

Southern Shell Fish Co., Harvey, La., operating a fish canning plant, a subsidiary of Southern Cotton Oil Co., Gretna, La., has let general contract to Lionel F. Favret, 937 Gravier Street, New Orleans, for one-story addition, 100 x 200 ft., in part for storage and distribution. Cost about $40,000 with equipment.

J. B. Klein Iron & Foundry Co., 1004 West Second Street, Oklahoma City, Okla., will soon begin construction by day labor for one-story addition, 40 x 140 ft. Cost over $30,000 with equipment. J. B. Robinson is general manager.

D. & B. Pump & Supply C., Love Field district, Dallas, Tex., manufacturer of oil well pumping, drilling and allied equipment, has plans for new one-story machine shop, 124 x 210 ft. A monorail craneway will be installed. Cost over $100,000 with equipment. Austin Co. of Texas, Dallas, is architect and engineer. Lost noted company was recently awarded contract for one-story addition to same plant, for which superstructure is now under way, for production of sucker rods and kindred oil well equipment. Cost about $45,000 with machinery. Company is a division of Emsco Derrick & Equipment Co., Los Angeles.

Common Council, Sulphur Springs, Tex., plans new municipal electric light and power plant and distribution system. Cost



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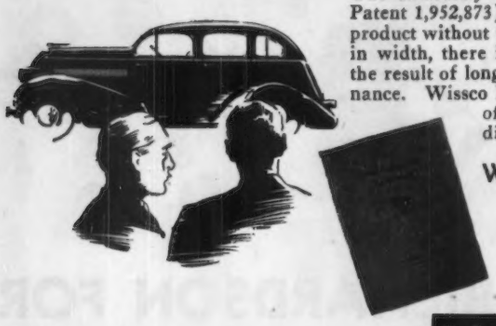
JUDGE A BELT AS YOU JUDGE YOUR CAR

for Reliability, Maintenance and Length of Life



The uniformly flat surface of the Wissco (U. S. Patent 1,952,873) Spiral Conveyor Belt carries the product without tipping. Because it does not shrink in width, there is "no stretching" in length, with the result of longer life and freedom from maintenance. Wissco Belts are made in a wide variety of metals suitable for unusual conditions and elevated temperatures.

Wickwire Spencer Steel Co.

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Write for the New Wissco Conveyor Belt Hand Book.

about $260,000. Financing is being arranged through Federal aid. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

PACIFIC COAST

L. & S. Rod & Reel Co., 225 Kauffman Street, El Monte, Cal., manufacturer of fishing tackle and equipment, has plans for one-story addition, 20 x 60 ft., to be increased soon to 60 x 100 ft. Installation will include lathes, drills presses, punch presses and other tools. Cost close to $25,000.

Board of Education, Long Beach, Cal., has asked bids on general contract for new one-story manual training shop and two-story science building at George Washington high school. Cost over $8J,000 with equipment. W. Horace Austin, 532 Chestnut Avenue, is architect.

Sacramento Municipal Utility District, Sacramento, Cal., Albert E. Givan, chief engineer, has applied to PWA for fund of $5,000,000 to be used for total appropriation of $12,000,000 for new hydroelectric generating plant, to cost about $3,000,000 with equipment, and electric transmission and distributing lines to cost approximately $7,000,000, including power substation, switching station and service facilities, remainder of fund, $2,000,000, to be used for operating capital. Bond issue will be arranged for additional amount over proposed PWA grant. Work is scheduled to begin this fall and will require 24 months for completion.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 18 for one electric furnace for San Diego Navy Yard (Schedule 6103).

Keystone Steel & Wire Co., Peoria, Ill., manufacturer of wire fencing, gates, barbed wire products, etc., has arranged for lease of one-story buildings, 120 x 150 ft., to be erected at 1225 Railroad Avenue South, Seattle, for new Pacific Coast factory branch, storage and distributing plant. Cost over $40,000 with equipment. General contract has been let to Martin Schuehle, 9316 Seventh Avenue South, Seattle. E. Glen Morgan, Seaboard Building, same city, is architect.

Jobbers Petroleum Sales Co., 902 Virginia Street, Seattle, has taken out permit for initial unit of new bulk oil storage and distributing terminal at Vancouver, Wash. Cost about $40,000 with steel tanks, pumping station and other equipment. Later a battery of five to seven steel tanks will be installed. N. W. Hale is president.

FOREIGN

Ministry of Industry, Government of China, Shanghai, China, has authorized plans for new paper mill at Wencho, Chekiang Province, to be built in several units for production of newsprint and other paper stocks, including writing papers. Project will include power house, machine shop and other mechanical departments. Cost close to $1,000,000 with equipment.

Paul Virany, Olasz fasor 5, Budapest, Hungary, is at head of project to erect a local ceramic plant, for production of earthenware specialties, wall tiles and other products. It is proposed to install American machinery and inquiries for equipment will be made soon.

Ministry of Industry, Government of Austria, Vienna, has approved plans for a new airplane plant at Wiener Neustadt, first to be established in country since world war. Cost over $300,000 with machinery.

Stadacona Rauyn Mines, Ltd., Montreal, Que., Roy Anderson, 611 Transportation Building, Montreal, secretary, plans new mill at gold mining properties to handle about 200 tons of crude ore per day. Cost over $300,000 with machinery.

Nominate R. R. Teetor To Head S.A.E.

RALPH R. TEETOR, vice-president in charge of engineering, Perfect Circle Co., has been named for the presidency of the Society of Automotive Engineers for 1936, according to an announcement made at the S.A.E. production meeting held in Cleveland, Sept. 19, during the Machine Tool Show and Congress.

Mr. Teetor is chairman of the research committee of the society and served on its council in 1930.

Other nominations for officers include: For treasurer, David Beecroft, manager, New York office, Bendix Aviation Corpn. For vice-presidents: representing aircraft engineering, Mac Short, vice-president and chief engineer, Stearman Aircraft Co.; representing aircraft-engine engineering, Opie Chenoweth, research engineer, United States Army Air Corps, Wright Field; representing Diesel-engine engineering, F. M. Young, president, Young Radiator Co.; representing fuels and lubricants engineering, T. B. Rendel, in charge of automotive research laboratory, Shell Petroleum Corpn.; representing passenger-car engineering, Earl H. Smith, development engineer, Packard Motor Car Co.; representing passenger-car-body engineering, Ronald J. Waterbury, body engineer, Chevrolet Motor Co.; representing production engineering, Karl L. Herrmann, vice-president, Bantam Ball Bearing Co.; representing transportation and maintenance engineering, Harley W. Drake, superintendent of garage, Portland Gas & Coke Co.; representing truck, bus and railcar engineering, Adolf Gelpke, assistant chief engineer, Autocar Co.

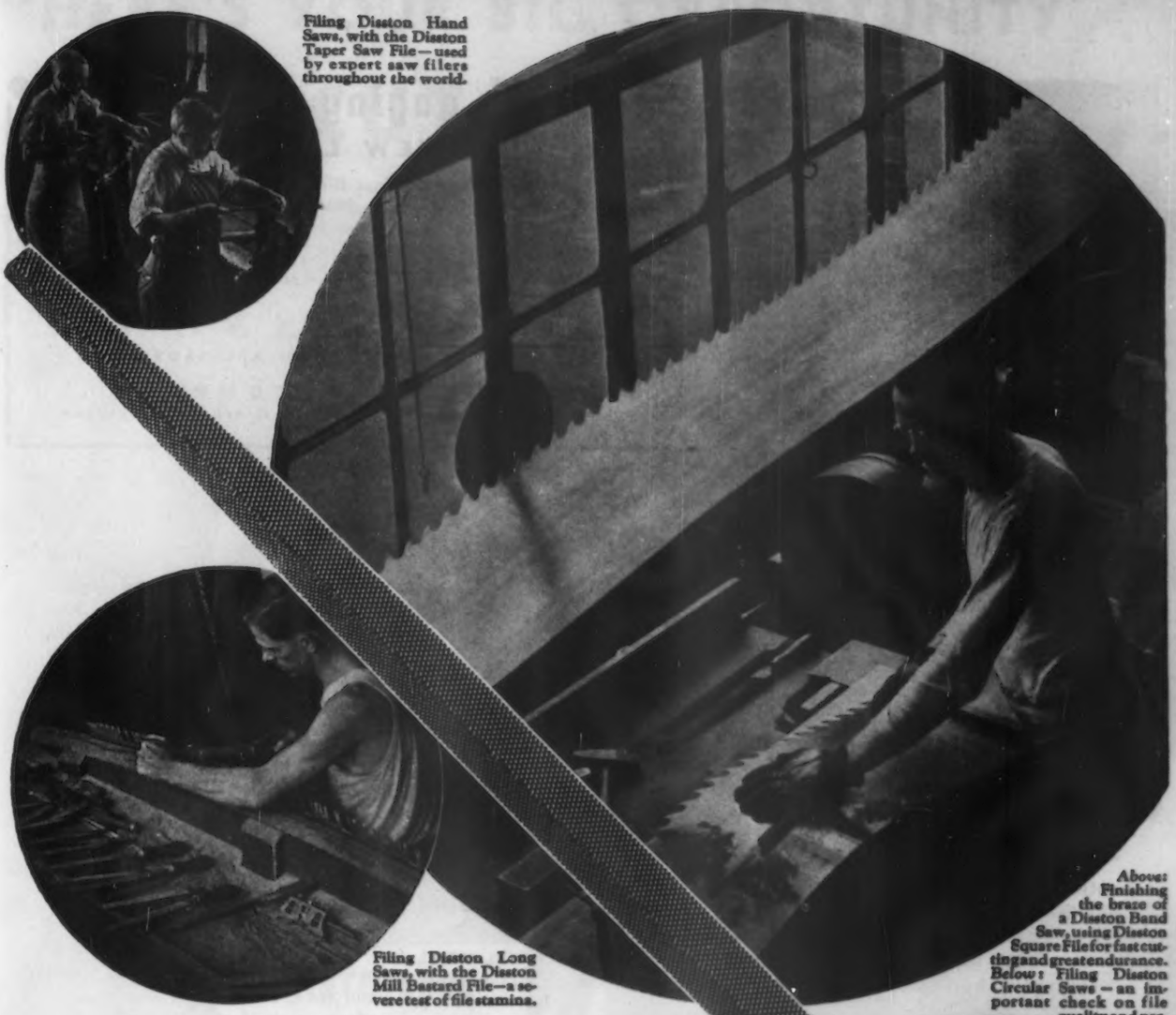
Business Activity Continues to Gain

THE improvement in business activity, which has been noted during the last two months, continued during August and the first half of September, according to the regular monthly survey of the National Industrial Conference Board.

Greater-than-seasonal increases took place in the construction, steel, and electric power industries. Machine tool orders rose slightly less than the usual seasonal amount during August, but remained more than three times greater than a year ago. Automobile output declined 33 per cent during August, compared with an estimated normal seasonal decline from July to August of about 5 per cent. The decline was due to a reduction in operating schedules in preparation for the introduction of new models in the fall, instead of at the beginning of the year. This change will probably affect the seasonal course of production in the industry so that, for the next few months, at least, comparisons with past years will be of uncertain value.

Residential building contracts declined after adjusting for seasonal influences, for the first time since February. The loss was more than counterbalanced, however, by a rise in non-residential construction.

Filing Disston Hand Saws, with the Disston Taper Saw File—used by expert saw filers throughout the world.



Filing Disston Long Saws, with the Disston Mill Bastard File—a severe test of file stamina.

Above: Finishing the braze of a Disston Band Saw, using Disston Square File for fast cutting and great endurance. *Below:* Filing Disston Circular Saws—an important check on file quality and performance.

The Saw-Steel Test

Experience leads to improvement. Few industrial plants on earth have had *shop experience* in the USE of files to equal that of the Disston Saw, Tool and File Works.

And so,—using thousands and thousands of dozens of files every year in its own shops, the Disston plant became one of the world's largest industrial consumers of files and one of the most experienced producers.

Every year many thousand dozens of Disston Files go up against this saw-steel test.

And, through the years, just as Disston has worked to improve saws, so Disston has worked to improve files.

All this wealth of experience, all this investment in research and experiment, is capitalized to your advantage when you use Disston Files.

WRITE for Disston Metal-Cutting Manuals: "Files", "Hack Saws", "Circular Saws", "Band Saws", "Carboloy Products". Free!

SQUARE FILE.—Same basic Disston tooth design as built into Flat and Half Round Bastard files. Same keen bite, free cutting, same stamina and ruggedness. The file with the strong heart and long life.

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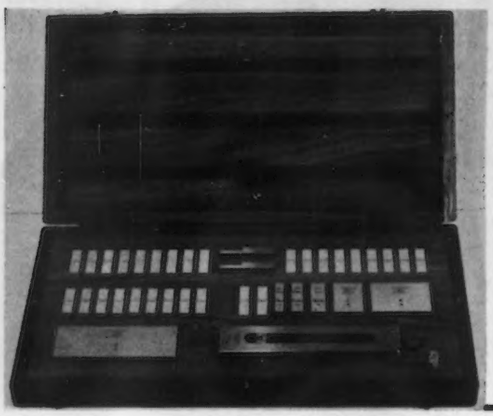

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CONSISTS of 35 Johansson Gage Blocks and 3 Accessories. Makes 80,000 different size gages in .0001-inch steps from .200 inch to more than 8.000 inches. Accessories include Adjustable Holder (0"—4.125") and 2 Jaws (.250").

Working Set (in case) $175 Inspection Set (in case) $220

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GAGE BLOCKS AND ACCESSORIES
FORD MOTOR COMPANY
Johansson Division • Dearborn, Michigan

Lubrication of Anti-Friction Bearings

(CONTINUED FROM PAGE 17)

ly the same speed might, because of higher ball speed, create sufficient friction as to produce overheating and would, therefore, require another lubricant or another method of application.

LOAD: In any radially loaded anti-friction bearing, the load on any specific ball or roller is not constant, but varies from practically zero to some maximum value, depending on the position of the ball or roller with respect to the line of the load. Obviously, the higher the speed the shorter is the time during which any particular ball or roller is subject to the maximum load, and the less likely is the oil film to rupture. However, due to the spacing of the balls or rollers, the load is not transferred from one ball or roller to another gradually but to a certain extent is applied suddenly, thereby causing minute vibrations and impact or shock loading conditions. This action is magnified at high speeds, and is the reason for the decreased load-carrying capacity of these bearings at high speed. This sudden transferring of the load from one ball or roller to another also explains why these bearings are not suitable for mounting certain precision grinding and lapping spindles.

Thus it is apparent that the load on the bearing itself is not a true criterion for selecting a lubricant for these bearings; but rather it is necessary to consider jointly speed and load, because of the former's effect on the latter.

SIZE: As previously indicated, size enters into the problem of selecting a lubricant for these bearings mainly through its effect on ball or roller and separator speeds. Hence if the speed of these elements is made the basis of selection it is not necessary to consider size in recommending a suitable lubricant.

METHOD OF APPLICATION: The methods of application may be logically divided into two general groups, as follows:

I—Methods of oil application
1. Splash feed
2. Drop feed
   a. Sight-feed cups
   b. Wick-feed cups and boxes
3. Atomization or spraying
4. Circulation oiling
5. Ring oiling.

II—Methods of grease application
1. Grease packed
2. Grease pressure gun
3. Grease cups.

In the case of splash, circulation

(CONTINUED ON PAGE 88)

TABLE I—A GUIDE TO THE SELECTION OF ANTI-FRICTION BEARING OILS

Type of Bearing	Operating Temperature (Deg. F.)	Speed (r.p.m.)	Body of Lubricant	Viscosity, Saybolt Universal 100 Deg. F.	130 Deg. F.	210 Deg. F.
Ball Bearing	32-140 (Normal)	3,000-15,000	Extra light	64	48	36
		300-3,000	Light	126	73	41
		50-300	Heavy medium	285	128	47
		Under 50	Heavy	380	160	51
	140-180 (High)	Over 3,000	Heavy medium	285	128	47
		300-3,000	Heavy	380	160	51
		Under 300	Extra heavy	505	200	55
	Over 180 (Very high)	Any	Steam cylinder oil	1,950	775	140
	Under 32	Any	Light*	139	79	42
Roller Bearing	32-140 (Normal)	300-3,000	Light	126	73	41
		50-300	Heavy medium	285	128	47
		Under 50	Heavy	380	160	51
	140-180 (High)	Over 3,000	Heavy medium	285	128	47
		300-3,000	Heavy	380	160	51
		Under 300	Extra heavy	505	200	55
	Over 180 (Very high)	Any	Steam cylinder oil	1,950	775	140
	Under 32 (Low)	Any	Light*	139	79	42

*This oil should have not less than —15 Deg. F. pour point. Excessive and shock loads require special consideration.

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*Actual monthly costs in a large middle-western plant in the steel industry.

..and the Gulf Engineer Can Help You Do It!

THERE'S one big advantage in using Gulf lubrication in your plant: *It is the Gulf engineer's job* to assist you in reducing equipment maintenance expenses besides the mere cost of the lubricants.

And he is trained to do it. Every Gulf field engineer is a thoroughly experienced man—a lubrication specialist. He has worked with machinery similar to yours in many plants and you benefit from his knowledge. A large staff of such men is employed by the Gulf Refining Company. If you are not using Gulf products, why not let a Gulf engineer advise you if the lubrication practice in your plant is susceptible of improvement?

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GULF REFINING COMPANY, PITTSBURGH, PA.

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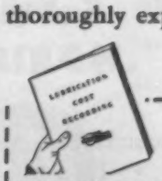


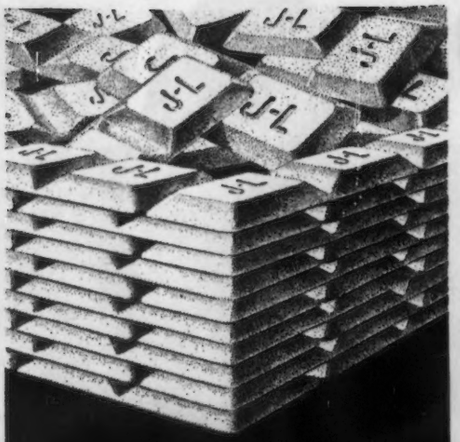
THIS BOOKLET has been prepared to assist you in analyzing and reducing your operating and maintenance costs. YOUR COPY IS READY.

GULF REFINING COMPANY, I.A.-
3800 Gulf Building, Pittsburgh, Pa.

Please send without obligation, booklet "Lubrication Cost Recording.

Name.....
Title.....
Company.....
Address.....

Foundry
and malleable
pig iron, made
with ore only



J&L ELIZA
PIG IRON

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

(CONTINUED FROM PAGE 86)
and ring oiling, the oil is used over and over for a considerable period of time, depending on the frequency of draining. It is obvious that a high-grade oil is desirable for these systems in order to minimize oxidation and sludging.

When drop-feed is employed the oil is only used once and then runs to waste; hence the oil is not required to render long-continued service. A relatively cheap grade of oil may be used in this case. It must be, of course, free of corrosive agents.

The grease-packed method requires less attention than any of the other various methods. Frequently, where operating conditions are not severe, anti-friction bearings are grease packed at assembly and no additional attention is required.

Where it is desirable to refill anti-friction bearings this may be readily accomplished by attaching either a grease cup screwed into the closure cap or a pressure-gun fitting. Where such fittings are used it is desirable to provide a tapped hole opposite the fitting, and when regreasing, the bottom plug be taken out and only sufficient grease added as to cause the old grease to ooze out at this point. Overfilling grease-packed bearings is frequently done. In general, they should not be filled more than half full. Filling them too full results in overheating and leakage past the closures.

Scrap Institute To Meet at Cleveland

THE semi-annual meeting of the Institute of Scrap Iron and Steel will be held at the Statler Hotel, Cleveland, Oct. 23 and 24. The purpose of the conference will be to elect a new board of directors, in accordance with the reorganization plan of the institute; amend the by-laws and prepare a program for the next year. The directors will also hold meetings on both days. Benjamin Swartz, 11 West Forty-second Street, New York, is director general.

TABLE II—A GUIDE TO THE SELECTION OF ANTI-FRICTION BEARING GREASES

Type of Bearing	Operating Conditions: Temperature (Deg. F.)	Operating Conditions: Speed (r.p.m.)	Viscosity of Mineral Oil Content	Type of Soap Base	Consistency	Remarks
Ball Bearing and Roller Bearing	32-150 (Normal)	Up to 2,000	400-500	Calcium or Sodium	No. 3 (Medium)	12 to 15 per cent soap; remainder mineral oil. Use calcium base in presence of moisture, as soda base grease emulsifies with water. These greases should be free from free acids, alkali and fillers. Moisture and ash content should be less than 2 per cent. Greases are not suitable for speeds above 5000 r.p.m. when moisture is present.
		2,000-5,000	300-400	Calcium or Sodium	No. 2 (Soft)	
		5,000-10,000	200-300	Sodium	No. 1 (Very soft)	
		Above 10,000	100-150	Sodium	No. 0 (Semi-fluid)	
	150-200 (High)	Up to 2,000	500-600	Sodium	No. 4 (Hard)	18 to 20 per cent soap; remainder mineral oil. Greases should not be used in the presence of moisture at these temperatures. These greases should be devoid of free moisture and contain no fillers such as talc, rosin, graphite, mica, etc. They should be of a smooth texture—not of a fibrous or spongy nature.
		2,000-5,000	400-500	Sodium	No. 3 (Medium)	
		5,000-10,000	300-400	Sodium	No. 2 (Soft)	
		Above 10,000	200-300	Sodium	No. 4 (Hard)	

MODERN ROLL TECHNIQUE

Phoenix Rolls are a quality product in which the reputation of the maker is an invisible but important ingredient and a guide to real satisfaction in buying rolls on a strictly performance basis.

PHOENIX ROLLS

PHOENIX STEEL, for unusual strength; PHOENIX "A" (steel alloy), for strength and wear; PHOENIX METAL—PHOENIX "K", for strength, wear and finish; PHOENIXLOY (uniformly hard), for flat rolling where high finish of extremely thin gauge of material is required to be free from all marks or defects. PHOENIX CHILL; PHOENIX NICKEL CHILL; for all flat rolling requiring finish. Also tube mill rolls of quality material best suited to the kind of service required.

PITTSBURGH ROLLS CORPORATION

PITTSBURGH, PA.

in the FIGHT *against* FRICTION

Abbott Steel Balls are closely allied with dependable bearing performance. They are specified by leading manufacturers who realize that stamina and precision in the bearing assemblies win satisfied customers for their products. Whether you make lawn mowers or roller skates, bicycle pedals or factory trucks, get acquainted with Abbott values on your next requirements. In the meantime, samples for test are yours for the asking.

THE ABBOTT BALL COMPANY

1047 New Britain Avenue, Hartford, Connecticut

Buick Improves Quality and Cuts Costs of Forgings

(CONTINUED FROM PAGE 21)

bushings in the base and cap and secured in position by locking-type nuts. The moving platen is guided on the columns and carries full-length Naval bronze bushings. Clearance between the columns is 30½ x 48 in., daylight 42 in. and stroke 24 in. The piston is made of air-furnace iron with a rolled finish and is outside packed with Chevron-type packing. The hydraulically-operated, pull-back cylinders are steel castings and are inserted in the cap. Pull-back pistons also are outside packed.

Power is furnished by a motor-driven six-throw reciprocating-type constant delivery pump. The body of the pump is machined from a solid steel forging, fitted with stainless steel renewable valve seats and stainless steel valves. All other fittings are hydraulic bronze. Operating valves also are machined from solid steel forgings, with fittings similar to those used in the pump. The hydraulic valves are operated by pneumatic pilots so arranged that control is semi-automatic. To make the ram descend, the operator steps on a foot treadle, holding it down until the proper tonnage is reached. When he removes his foot, the platen motion reverses, regardless of the position of the platen, and the platen returns to a predetermined "up" position. Since the stroke is adjustable from 0 to 24 in., it is not necessary to employ the full stroke.

By means of an overhead single tank and an automatic pneumatically-operated check valve, the main cylinder is filled with slack water on the down stroke, leaving only a comparatively small amount of pressure water to be furnished by the pump. This accounts for the unusually speedy operation of the press, as compared with the standard hydraulic unit.

After being automatically quenched in water, crankshafts pass through a draw furnace 50 ft. long. This furnace, designed and built by Buick, is of uncommon length in order to take care of the required volume of work. The next step is the pickling of the crankshafts. The final operation is a thorough inspection of the shafts to make sure that they come up to Buick's rigid standards.

All gears for Buick passenger cars are made of General Motors No. 3150 steel, which is of the following analysis: nickel 1.00 to 1.50 per cent; carbon 0.48 to 0.53 per cent; manganese 0.60 to 0.90 per cent; and chromium 0.45 to 0.75 per cent. Transmission gear forgings are shaped from commercial round bar stock varying in size from 1½ to 1⅞ in. in diameter and from 18 to 50 in. in length.

Chief interest centers in the fact that all transmission gears are pierced instead of being produced as a solid blank. In the case of the countershaft gear, a hole 55/64 in. in diameter and 7 in. long is pierced. The progressive piercing operations on the countershaft gear are nine in number, the first five being performed in one horizontal forging machine and the last four in another. In connection with each machine the various operations are done without reheating the bar.

Gears which are pierced in the forge shop are six in number: countershaft gear, clutch gear, first and reverse gear, second speed gear, idler gear and synchronizing sleeve gear.

The revamped Buick forging department is capable of producing 2000 crankshaft forgings a day, an increase of 33 per cent over its former capacity. It likewise is equipped to manufacture gear forgings for 2250 complete transmissions a day, which is 46 per cent greater output than previously was possible. In addition, it turns out many other forged parts not only for Buick, but also for the Olds Motor Works division of General Motors.

Northwestern Barb Wire Co., Sterling, Ill., is offering a new issue of $1,250,000 first mortgage 5 per cent sinking fund bonds the proceeds from which will be used to retire the company's $350,000 indebtedness to the American Steel & Wire Co. and for extensions and new equipment. Approximately $800,000 will be expended for an electric furnace and a rolling mill with necessary accessory equipment and buildings. The Northwestern Barb Wire Co. was founded in 1879 and it manufactures a complete line of wire products of which about 80 per cent is used by agricultural and building trades, and 20 per cent by industrial trades.

LET SOUND THINKING GUIDE YOUR CHOICE

SOUND THINKING, SO WELL PORTRAYED HERE BY RODIN'S FAMOUS STATUE "THE THINKER," HAS ENABLED SUCCESSFUL INDUSTRIAL ENTERPRISES TO SOLVE THEIR MOST DIFFICULT PROBLEMS THROUGH EVERY PERIOD OF BUSINESS UNCERTAINTY. ★ SOUND THINKING ON DRILLING AND REAMING PROBLEMS, WE BELIEVE, WILL BRING YOU TO THE CONCLUSION THAT THE 59-YEAR OLD PREFERENCE FOR "CLEVELAND" TWIST DRILLS AND REAMERS IS INDISPUTABLE PROOF OF LOWER COST-PER-HOLE PERFORMANCE. ★ "CLEVELAND" DRILLS AND REAMERS ARE ALWAYS MARKED WITH THIS SYMBOL ◇C◇ . IT IS THE MARK OF GOOD TOOLS THOUGHTFULLY MADE.

★ ★ ★ ★ ★ ★

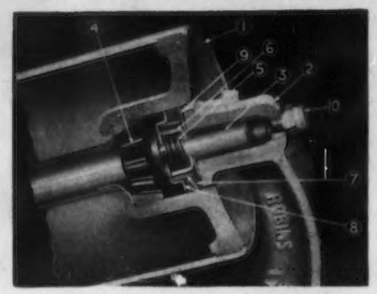
THE CLEVELAND TWIST DRILL COMPANY, *Cleveland, Ohio, U. S. A.*

STOCKROOMS IN NEW YORK, CHICAGO, SAN FRANCISCO AND DETROIT

"Cleveland" Distributors everywhere are ready to serve you

ROBINS CONVEYOR IDLERS
have these characteristics

1. Pulleys, iron or steel completely closed
2. Sturdy Supporting Brackets
3. Hollow Steel Shafts
4. Timken Tapered Roller Bearings
5. Automatic Wear Adjustment
6. Steel Housing for Spring
7. Cork Composition Seal
8. Steel retainers for cork washer
9. Steel Labyrinth Washer
10. Grease-fitting safe and accessible



Proofs of the soundness of Robins basic design are the records of low costs that Robins Idlers have established in handling bulk materials of all kinds with conveyor belts.

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15 Park Row, New York City
Branches in principal cities

Belt Conveyors
Idlers—(Conveyor)
Bucket Elevators
Crushers
Portable Conveyors
Engineering Assemblies
Gates—Bin & Hopper
Screens
Mead-Morrison Line

Send for Descriptive Literature

MATERIAL HANDLING ROBINS EQUIPMENT

TRADE NOTES

Clark Controller Co., Cleveland, has appointed Harris-Green Co., Farmers Bank Building, Pittsburgh, as sales engineering representative. Pittsburgh branch office of Clark company will be maintained.

Patron Millwright & Transmission Co., 162 Grand Street, New York, manufacturer of conveying equipment, is moving to larger quarters at Lafayette and Grand Streets. E. Patron is head of company.

S. S. White Dental Mfg. Co., Industrial Division, which handles all of industrial products manufactured by company, including flexible shafts, flexible shaft driven machines, small cutting and grinding tools, molded resistors, etc., has moved its offices to new and larger quarters on twenty-third floor at 10 East Fortieth Street, New York. George T. Latimer is manager of division.

Rawlplug Co., Inc., has opened office at 1907 Canton Street, Dallas, Tex., where a stock of Rawlplugs, Rawl-Anchors, Rawl-Drives, Rawldrills, Crowners, and Lok-Crowners will be carried. Branch will be known as Rawlplug Dallas Co. and will be in charge of D. P. Fletcher. Entire northern section of Texas will be serviced from the new branch.

American MonoRail Co., 1310? Athens Avenue, Cleveland, manufacturer of overhead material handling systems, has opened sales and engineering office in Detroit at 7338 Woodward Avenue. C. L. Fell is engineer in charge.

Miller Steel Co., Inc., Newark, N. J., has recently been appointed warehouse distributers of mechanical seamless steel tubing for Globe Steel Tubes Co., Milwaukee.

Miller Steel Co., 49 Empire Street, Newark, N. J., recently organized, has taken warehouse at the above address, and will maintain large and extensive warehouse stocks of cold-finished screw stock and shafting, cold-drawn seamless and stainless steel tubing, cold-rolled sheets, brass rod, drill rod, aluminum, cold-rolled strip steel and cold-rolled shim steel and flat wire.

Fansteel Metallurgical Corpn. is new name of former Fansteel Products Co., North Chicago, Ill. Change in name became effective Aug. 28.

American Hammered Piston Ring Co., Baltimore, and Skinner Chuck Co., New Britain, Conn., will cooperate in manufacture and sale of Gold Seal and Silver Seal piston rings. For four years Skinner company has been carrying on laboratory and field tests on rings with peripheral anti-friction metal inserts, in which tests American Hammered Piston Ring Co. has cooperated.

Steel Sales Corpn., St. Louis, has recently opened warehouse at 4067 Park Avenue.

Foote Gear Works, Inc., 1301 South Cicero Avenue, Chicago, Ill., announces Washington Engineering Co., Perkins Building, Tacoma, distributer in the State of Washington west of the Columbia River; also, the Kemp Machinery Co., 211 President Street, Baltimore, distributer in Maryland, District of Columbia, Virginia, northwest Florida and parts of Georgia and Tennessee.

Spring & Wire Corpn., Detroit, has completed second branch plant, located in the Clearing industrial district of Chicago. Star Service Hanger Co., a subsidiary, has been located there since 1929. H. Perry Phelps, vice-president of the Clearing industrial district, reports that this is the thirty-fourth new industry to locate there since the beginning of the depression.

Peninsular Steel Co., Cleveland, has erected an addition to Detroit warehouse located at 1030 McDougall Avenue. Contract was let to the W. C. J. Kaufman Co., Detroit.

New Trade Publications

Abrasive Cut-Off Wheels.—Norton Co., Worcester, Mass. Instructive 28-page booklet, devoted to time saving features, types of bond, types of machines and cuts. Tables of general and special recommendations relating to wheels for use on different materials are included.

Ball Bearings.—New Departure Mfg. Co., Bristol, Conn. Thumb-indexed, 145-page booklet giving dimensions, load data and list prices. Notes on bearing design, selection and mounting are included in this attractive tenth edition.

Comparator and Measuring Machine.—Jones & Lamson Machine Co., Springfield, Vt. Catalog describing J & L optical projection machines. One section is devoted to the pedestal type comparator and measuring unit and another to the bench type and model C comparator. The latter is a large unit for inspecting contour and size of irregular-shaped objects. Illustrations include close-ups of both machine features and optical system. Applications are also described and illustrated.

Air Conditioning Regulation.—Leeds-Northrup Co., Philadelphia. Bulletin 4001 describing use of 3-lead, null-type electrical-resistance thermometers in regulating an air conditioning system.

Portable Electric Tools.—Black & Decker Mfg. Co., Towson, Md. Attractive silver anniversary catalog, 50 pages, giving design features, applications, specifications and other data relating to electric drills, saws, grinders, screw drivers, bench machines and other tools made by the company.

Die Heads.—Geometric Tool Co., New Haven, Conn. Three booklets describing respectively the DJ solid adjustable die head; the class SJ tap; and the styles KH2 and KHL die heads, the latter being a revamped line. The style DJ die head is a new inexpensive tool that swings in small space for short-length threading jobs and may be used on machines having very limited tooling room.

Threading Machines, Die Heads and Taps.—Landis Machine Co., Waynesboro, Pa. Booklet giving 12 or more plant performance records of various Landis machines and tools. A section briefly describes and illustrates various standard machines and tools, including pipe threading and cutting machines.

Welded Piping.—Air Reduction Sales Co., Lincoln Building, New York. Advantages and economies of the Airco-Welding process are outlined in a 25-page booklet entitled, "The Facts About Welded Piping for Buildings." A number of typical installations are illustrated.

Hydraulic Pumps, Motors and Transmissions.—American Engineering Co., Philadelphia. Catalog F, 44 pages, with more than 100 illustrations, charts, tables and drawings, and data showing construction of Hele-Shaw pumps, motors, transmissions, regulators, pumping units, differential valves and pipe testing machines. Applications include heat-treating furnaces, hydraulic riveters, ladle tilters, flanging and other presses, die casting machines, plate pushers, pipe benders, billet peelers stretcher levelers and others.

DEPENDABILITY

WE would be lost without the things in life that we take for granted—that we accept without question.

Our customers after 38 years of experience take it for granted that they get *good strip steel* from West Leechburg—they are not disappointed—promises are kept and quality is assured. Nothing exceptional is offered them, just day-in-and-day-out service that leaves them free to worry [if they must] about other things rather than strip steel. Will you join our "satisfied customer" group?

We also roll and sell ALLEGHENY stainless. All grades in strip form.

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General Offices: UNION BANK BLDG., PITTSBURGH, PA.

Branch Sales Offices:

NEW YORK . CHICAGO . DETROIT . CLEVELAND . DAYTON . ST. LOUIS . TOLEDO [Dean Higgins & Co.] . NEWARK [Edgcomb Steel Corp.] . PHILADELPHIA [Edgcomb Steel Co.] . TORONTO, ONT. [Jessop Steel Co.] BUFFALO—ROCHESTER—SYRACUSE [Brace-Mueller-Huntley, Inc.]

Warehouse Stocks of Cold Rolled Strip Steel are carried by:

JOS. T. RYERSON & SON

YOUR fitting requirements are exacting as to accuracy, workmanship and design . . . line up with the leaders—specify
Weatherhead
FOR BRASS FITTINGS AND SCREW MACHINE PRODUCTS
THE WEATHERHEAD CO., 620-714 Frankfort Ave., Cleveland, Ohio

Analysis of First Half Steel Output Indicated Upturn in Heavy Industries

INDICATIONS of an upturn in the heavy industries, particularly privately financed building construction, are found in an analysis of steel production for the first half of 1935 just made by American Iron and Steel Institute.

During the second quarter of the year the output of steel for building purposes increased by 14 per cent over that for the first quarter, and it was the largest for any three-month period since the second quarter of 1934, when the total was swelled by public works construction.

A sharp spurt in buying of fences and steel for various uses on the farm occurred in the second quarter, and increasing purchases by many other industries, including railroads, were shown. The automobile industry, however, apparently retained its position as the largest single market for steel.

The increased demand in the second quarter for steel products used in building coincided with gains of nearly 100 per cent over the first quarter in residential building contracts, and of 25 per cent in nonresidential contracts as reported by the F. W. Dodge Corpn. By contrast, public works contracts were down 10 per cent from the first quarter and 52 per cent below the average for the first two quarters of 1934.

Nearly 1,232,000 gross tons of the steel products which are largely used in construction such as structural shapes, steel plates and piling, concrete reinforcing bars, galvanized sheets, butt-weld pipe, nails and conduits were produced for sale by the steel industry in the second quarter of this year.

This tonnage is 14 per cent above the total of 1,079,000 gross tons of these products produced in the first quarter of the year and represents about 19.3 per cent of the total tonnage produced in the quarter. First quarter production of steel building materials amounted to only 16.2 per cent of total production.

Total production for sale of steel products in the second quarters was 6,441,213 gross tons, down four per cent from the first quarter total of 6,661,995 gross tons.

Steel consumption by the automobile industry in the second quarter as indicated by the production for sale of merchant and alloy bars, sheets, except galvanized, and strip steel, of each of which the automobile and parts industry is by far the largest user, was about 425,000 gross tons, or 15.5 per cent below the first quarter.

Total tonnage of these products amounted to only 36.1 per cent of the total production in the second quarter, while first quarter tonnage of these products was 41.1 per cent.

Purchases of steel by farmers for fences, fence posts and bale ties in the second quarter were more than 30 per cent ahead of the quarter preceding, and 7.5 per cent above second quarter of last year.

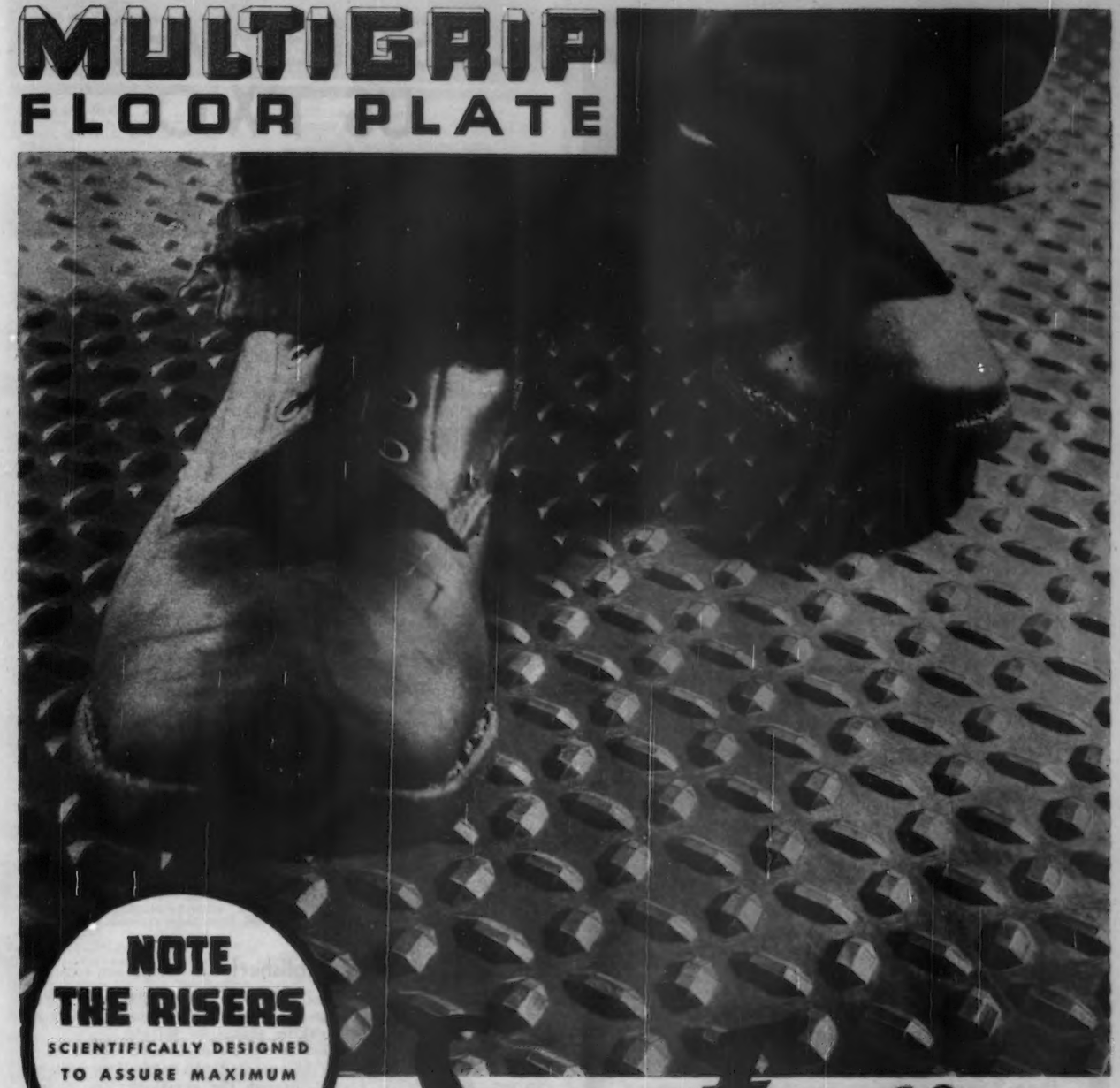
The railroads bought 81,000 gross tons more rails and fastenings, wheels, axles and track spikes in the second quarter than in the first, which increased their share of the total steel output from 4.1 per cent of the total in the first quarter to 5.5 per cent of the second quarter total. The total tonnage of such products in the first half of 1935, however, is about 450,000 gross tons below the first six months of last year.

The canning industry increased not only its tonnage consumption of steel in the second quarter, but also increased its comparative importance among other steel markets. A total of 491,050 gross tons of tin plate was produced for sale in the second quarter of 1935, which was 7.7 per cent of the total tonnage of steel products produced during the quarter. This compares with the production of 391,354 gross tons of tin plate in the first quarter—less than 6 per cent of the total for all products. In the second quarter of 1934 the tonnage of tin plate amounted to only 5.5 per cent of all steel products.

The Dow Chemical Co. won the suit brought by the Monsanto Chemical Co. and Swann Research Co. of Birmingham, Ala., in which patent infringements were alleged, when Federal Judge Arthur J. Tuttle sitting at Bay City, Mich., held the patents were void and lacking in invention. The suit was dismissed. It was claimed by Monsanto that processes for producing diphenyl by preheating and sudden cooling were covered by their patent and that a second patent covering the putting of benzol through tubes "rapidly and at turbulent flow" had been infringed upon.

A. O. Smith Corpn., Milwaukee, has booked initial orders aggregating more than 2100 tons of steel plate for a new type of oil cracking vessel in development nearly eight years from three major petroleum refiners. Asiatic Petroleum Co. has ordered 13 large vessels requiring 1500 tons for export to Holland; Standard Oil Co. of Indiana, nine bubble towers requiring 350 tons for rehabilitation of one of its refineries, and Wilshire Oil Co., three vessels requiring 250 tons for California refinery.

MULTIGRIP
FLOOR PLATE



NOTE THE RISERS
SCIENTIFICALLY DESIGNED TO ASSURE MAXIMUM SKID RESISTANCE AT EVERY ANGLE

Sure footing
PLUS

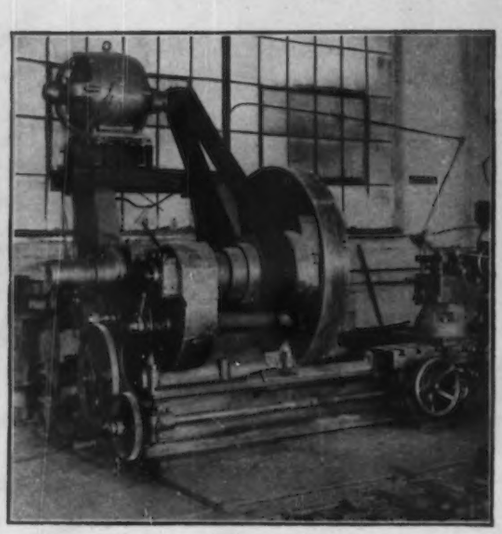
READY DRAINAGE • EASY CLEANING
COMFORT UNDER FOOT • ECONOMICAL
CUTTING • ATTRACTIVE APPEARANCE • AND
OTHER FEATURES FULLY DESCRIBED IN OUR PAMPHLET

CARNEGIE-ILLINOIS STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA • CHICAGO, ILLINOIS
Pacific Coast Distributors: Columbia Steel Company, San Francisco

United States Steel Corporation Subsidiary

RHOADS TANNATE LEATHER BELTING

for Metal Workers



TAKING A 1/4-IN. CUT FOR THIRTEEN YEARS . . . STILL ON THE JOB

Few drives are more exacting than this one—a short center, heavy duty lathe, taking 1/4-inch cuts at low speed. The lathe is used almost constantly, turning down heavy castings. The Tannate Belt was installed in 1922, and is still in good condition. The superintendent thinks the motor has not been moved back more than 2 inches during the past two years.

Longer life on hard drives, slight stretch and extra strong grip, together with superior resistance to steam, gases, acid fumes and oil make Tannate Leather Belting one of the most economical power transmitting mediums, as many buyers have proved.

It has increased output and saved trouble in many plants.

J. E. RHOADS & SONS

PHILADELPHIA, 35 N. SIXTH ST.
NEW YORK, CHICAGO, ATLANTA
CLEVELAND, WILMINGTON, DEL.

JUST BETWEEN US TWO

Skins Are Thinning

AS business gets better it seems that people get more irritable. A common Pat and Mike fable, used to illustrate a point in a recent editorial, brought a howl from a subscriber who accused us of maligning the Irish race.

A reference to Mussolini brought an "any-more-of-that-and-we'll-cancel" letter from an Italian manufacturer. "You talk about service to readers," sneers a California reader, "and fail to answer a question I asked you last April." We dug into the files and sent him a carbon copy of the reply we wrote him last April. Did he send back a gracious, "I'm sorry"? No, he didn't.

People seemed less touchy during the depression. Maybe the passing of the sink-with-the-ship camaraderie has something to do with it. Anyway, the snappishness curve seems to be going up with carloadings.

They Wipe Away Our Tears

BUT life isn't just one left jab after another. Just when we are reeling from one blow, along comes a hearty pat on the back that straightens us out. For instance, W.B.A. insists that this posy be passed along to Burnham Finney, our Detroit editor, who writes, "This Week on the Assembly Line":

> "You give more *real* NEWS in two pages than any other publication does in 200. You know your subject. Congratulations!"

Itanes, capitals and exclamation point are all W.B.A.'s.

W.M.B., a metallurgist, says:

> *"I have reviewed The Iron Age over a period of many years. This is in my judgment the most representative magazine of its type available to us at the plant."*

R.M.D. writes:

> *"Since The Iron Age adopted its present editorial tone, I have become an ardent reader of it and am kept surprisingly well informed on the ways of the industry."*

Which will be all for today.

Elementary, My Dear Hog and Pig Feed Man

H. A. Coleman and C. S. Cole cracked the cocoanut-monkey problem with one hand. The answer, they tell us, is 3121, and prove it, but don't tell how they arrived at it, leaving us still in the dark.

Oh for the Life of a Publisher!

ADVERTISING agency men lie awake nights thinking up ways of evaluating trade papers. Some of the questionnaires we get from them are back-breaking things to fill out.

But their purpose is laudable. When each of a dozen or so papers swears that it alone is the anointed, you need all the help you can get. So we plow grimly through the questionnaires, calling on the heavens above to guide us through the foggy spots.

The surest way of getting the right answer is to ask the client's customers and prospects what paper they like best. We like this, for THE IRON AGE usually scores a high top.

But here is another point in a recent agency questionnaire that has much to recommend it—"How many inquiries do you average from your readers?" Perhaps the thought is that the paper carrying the greatest weight in a given field will receive the most requests for information.

We must hold at least the world's record for getting letters beginning, "Can you tell us . . . ?" and are glad to learn that this is worth bragging about.

New Top Coat, Hat, Shoes—and Maybe a Suit

YOU won't be competing with any Sinclair Lewises in that contest for the best composition on up-to-date machinery, which is being run by THE IRON AGE.

If you haven't already submitted an entry, take a night off this week or next, and set yourself to win $50 to $200. You can do as well as the next one and maybe a whole lot better. Forget literary style. You have the facts in your head. Transfer them to paper. And, presto! a couple of hours' work may mean a couple of hundred dollars to you.

If you can't locate the copy of THE IRON AGE announcing the contest, drop us a line at 239 W. 39th St., N. Y. C., and we will send you a blank with full particulars. But write at once, for the contest closes Oct. 12 —A.H.D.

Products Index

FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Rockford (Ill.) Drop Forge Co.

FOUNDRY EQUIPMENT & SUPPLIES
Jeffrey Mfg. Co., The, Columbus, Ohio.

FUME DUCTS—Rubber Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffein Co., Chicago.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Annealing & Case Hardening
Electric Furnace Co., The, Salem, Ohio.
Wilson, Lee Engineering Co., Cleveland.

FURNACES—Billet or Ingot Heating
Flinn & Dreffein Co., Chicago.

FURNACES—Electric, Steel Melting
American Bridge Co., Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Mahr Mfg. Co., Minneapolis, Minn.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Mahr Mfg. Co., Minneapolis, Minn.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Heat Treating, Automatic
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Rockwell, W. S., Co., 50 Church St., N. Y. C.

FURNACES—Heat Treating, Cyanide or Lead
Amer. Gas Furnace Co., Elizabeth, N. J.
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Mahr Mfg. Co., Minneapolis, Minn.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.
Hoskins Mfg. Co., Detroit, Mich.
Mahr Mfg. Co., Minneapolis, Minn.
Rockwell, W. S., Co., 50 Church St., N. Y. C.

FURNACES—Heat Treating, Oil or Gas
Amer. Gas Furnace Co., Elizabeth, N. J.
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Mahr Mfg. Co., Minneapolis, Minn.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Pack Hoating Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.

GAGE BLOCKS
Ford Motor Co., Dearborn, Mich.

GAGE GLASSES
Jenkins Bros., 80 White St., N. Y. C.

GAGES—Plug and Snap
Pratt & Whitney Co., Hartford, Conn.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure and Vacuum, Recording
Bristol Co., The, Waterbury, Conn.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.

GALVANIZING
Cattie, Joseph P., & Bros., Phila.

GALVANIZING PLANTS—For Sheets
Erie (Pa.) Foundry Co.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Construction Co., The, Pittsburgh.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Construction Co., The, Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

GASKETS—Leather
Graton & Knight Co., Worcester, Mass.

GASKETS—Rubber
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., Akron, Ohio.

GATES—Blast
Rockwell, W. S., Co., 50 Church St., N. Y. C.

GEAR BLANKS—Composition
Richardson Co., The, Melrose Park, Ill.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Gleason Works, Rochester, N. Y.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Brown & Sharpe Mfg. Co., Prov., R. I.
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Lewis Foundry & Mch. Co., Pittsburgh.
Link-Belt Co., Chicago.
United Engineering & Fdry. Co., Pitgh.

GEAR LAPPING MACHINES
Michigan Tool Co., Detroit.
National Broach & Mch. Co., Detroit.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pitgh.

GEAR PLANING MACHINES
Gleason Works, Rochester, N. Y.

GEAR SHAVING MACHINES
Michigan Tool Co., Detroit.
National Broach & Mch. Co., Detroit.

GEAR TESTING MACHINES
National Broach & Mch. Co., Detroit.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
Simonds Mfg. Co., Pittsburgh.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
Richardson Co., The, Melrose Park, Ill.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.
Michigan Tool Co., Detroit.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pitgh.

GENERATORS — Electric, Second Hand. (See Clearing House Section)

GLUE HEATERS
Dart, E. M., Mfg. Co., Prov., R. I.

GOGGLES—Safety
American Optical Co., Southbridge, Mass.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. of Indiana, Chicago.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforated Co., Chicago.

GRINDING AND POLISHING MACHINES
Calder, Geo. H., Co., Lancaster, Pa.
Cincinnati (Ohio) Grinders, Inc.
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Cincinnati (Ohio) Grinders, Inc.

GRINDING MACHINES — Cutter & Reamer
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Gear & Worm
Pratt & Whitney Co., Hartford, Conn.

GRINDING MACHINES—Hob
Barber-Colman Co., Rockford, Ill.

GRINDING MACHINES—Internal
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GRINDING MACHINES—Internal Centerless
Heald Mch. Co., Worcester, Mass.

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GRINDING MACHINES—Portable Pneumatic
Buckeye Portable Tool Co., The, Dayton, Ohio.
Warner & Swasey Co., The, Cleveland.

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Cincinnati (Ohio) Grinders, Inc.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Snagging
Warner & Swasey Co., The, Cleveland.

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Norton Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Tool
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Universal
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.

GRINDING WHEEL DRESSERS AND CUTTERS
Calder, Geo. H., Co., Lancaster, Pa.

GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Carborundum Co., The, Niagara Falls, N. Y.
Macklin Co., Jackson, Mich.
Norton Co., Worcester, Mass.

GRIPS—Cable
Smith Devices, Philadelphia.

GRIPS—Plate
Smith Devices, Philadelphia.

GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.

GUARDS—Safety, for Punch Presses
Johnson, E. P., Rule Mfg. Co., Chicago, Ill.

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HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.

HAMMERS—Air, Forging
Nazel Engng. & Mch. Wks., Philadelphia.

HAMMERS—Drop
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
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Chambersburg (Pa.) Engineering Co.

HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, Ohio.

HANGERS—Ball Bearing
Fafnir Bearing Co., New Britain, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Roller Bearing Co., Newark, N. J.

HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

HEADING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
National Mchry. Co., Tiffin, Ohio.

HEADING MACHINES—Automatic, Electric
National Mchry. Co., Tiffin, Ohio.

HEADS—Spun and Pressed
Lukens Steel Co., Coatesville, Pa.
Worth Steel Co., Clarmont, Del.

HEADS—Steel—Flanged & Dished
Lukens Steel Co., Coatesville, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Corp., Niagara Falls, N. Y.

HEAT TREATING
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace Co., The, Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Chicago.
Parish Pressed Steel Co., Reading, Pa.

HEATERS—Unit
Buffalo (N. Y.) Forge Co., 492 B'way.
Fedders Mfg. Co., Buffalo, N. Y.
Nelson, Herman Corp., The, Moline, Ill.

HEATING RESISTANCE—Non-Metallic
Globar Corp., Niagara Falls, N. Y.

HEATING & VENTILATING APPARATUS
Nelson, Herman Corp., The, Moline, Ill.

HOBS
Michigan Tool Co., Detroit.

HOISTS—Air
Detroit (Mich.) Hoist & Mach. Co.
Ridgway, Craig & Son Co., Coatesville, Pa.

HOISTS—Chain
American Monorail Co., Cleveland.
Wright Mfg. Co., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric
American Engineering Co., Philadelphia.
American Monorail Co., Cleveland.
Detroit (Mich.) Hoist & Mach. Co.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Co., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric Traveling
Cleveland Tramrail, Wickliffe, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

HOISTS—Monorail
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HONING MACHINES
Barnes Drill Co., Rockford, Ill.

HOOPS—Wire
American Steel & Wire Co., Chicago.

HOSE—Gasoline & Oil-Proof
Weatherhead Co., The, Cleveland.

HOSE—Rubber
Goodrich, B. F., Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.

HYDRAULIC FEEDS
Vickers, Inc., 1420 Oakman Blvd., Detroit.

HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.

INSTRUMENTS—Recording
Bristol Co., The, Waterbury, Conn.

IRON WORKERS—Universal
Buffalo (N. Y.) Forge Co., 492 B'way.

IRON—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co., The.

IRON—Powder
Ekstrand & Tholand, Inc., 441 Lexington Ave., N. Y. C.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

IRON—Stainless
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

IRON—Staybolt
Burden Iron Co., Troy, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Clipper Belt Lacer Co., Grand Rapids, Mich.

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LACQUER
Roxalin Flexible Lacquer Co., Inc., Elizabeth, New Jersey.
Sherwin-Williams Co., Cleveland.
Zapon Co., The, Stamford, Conn.

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LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LATHES—Automatic
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Bullard Co., The, Bridgeport.
Jones & Lamson Mch. Co., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, Ohio.
Pratt & Whitney Co., Hartford, Conn.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.

LATHES—Bench
Pratt & Whitney Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 E. Madison St.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, Ohio.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, Ohio.
Pratt & Whitney Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 E. Madison St.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

LATHES — Second-Hand. (See Clearing House Section)

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Monarch Mch. Tool Co., The, Sidney, Ohio.

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Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Turret, Vertical
Bullard Co., The, Bridgeport, Conn.

LEAD—In Oil
Sherwin-Williams Co., Cleveland.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEVELING MACHINES
Wean Engineering Co., Inc., The, Warren.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

LIQUIDATORS
RCA Mfg. Co., Inc., Camden, N. J.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gasoline
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Industrial
Jeffrey Mfg. Co., The, Columbus, Ohio.
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. of Indiana, Chicago.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. of Indiana, Chicago.
Sun Oil Co., Philadelphia.
Tide Water Oil Co. 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. of Indiana, Chicago.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tipple & Cleaning
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

MACHINE GUARD MATERIALS
Erdle Perforating Co., Rochester, N. Y.

MACHINE WORK
General Machine Works, York, Pa.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS — Second-Hand. (See Clearing House Section)

MAGNESITE—Brick or Dead Burnt
Carborundum Co., The, Perth Amboy, N. J.

MAGNESIUM
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

MAGNETS—Lifting
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5008 Maurice Ave., Cleveland.

MALLETS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANGANESE METAL
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N. Y. C.

MANIFOLDS—Oxygen
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

MARKING MACHINES
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

METAL PARTS—Rubber Covered
American Hard Rubber Co., 11 Mercer St., N. Y. C.

METAL SPECIALTIES
Crosby Co., The, Buffalo, N. Y.
Cuyahoga Spring Co., The, Cleveland.
Geuder, Paeschke & Frey Co., Milwaukee.
Torrington (Ct.) Co.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Worcester (Mass.) Stamped Metal Co.

METERS—Water & Oil
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

MICROMETER—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Machine Co., The.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati (Ohio) Milling Machine Co., The.

MILLING MACHINES — Second-Hand. (See Clearing House Section)

MILLING MACHINES—Vertical
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Machine Co., The.

MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL-METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Hand & Electric
American Monorail Co., Cleveland.
Cleveland Tramrail, Wickliffe, Ohio.

MOTORS—Electric
Fairbanks, Morse & Co., Chicago.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. Pgh.
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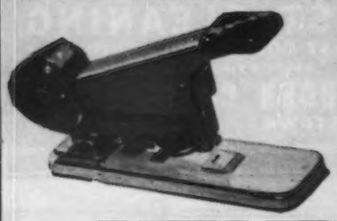

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LOW PHOS.

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NAILS—Wire
American Steel & Wire Co., Chicago.
Continental Steel Corp., Kokomo, Ind.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pacific Coast Steel Corp., San Francisco, Calif.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL-CLAD STEEL
Lukens Steel Co., Coatesville, Pa.

NICKEL ANODES—Rolled or Cast
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NITROGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

NUMBERING MACHINES—For Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUT MAKING MACHINERY
National Mchry. Co., Tiffin, Ohio.

NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Castellated
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Thumb Malleable
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Soluble—See Oils—Cutting

OILS—Cutting
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. of Indiana, Chicago.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

ORES—Iron
Cleveland Cliffs Iron Co., Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Construction Co., The, Pittsburgh.

OVENS—Core and Mold
Holcroft & Co., Detroit.
Mahr Mfg. Co., Minneapolis, Minn.

OVENS—Cross Regenerative
Koppers Construction Co., The, Pittsburgh.

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Mahr Mfg. Co., Minneapolis, Minn.

OXY-ACETYLENE—Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.
Booth Felt Co., Inc., The, 435—18th St., Brooklyn, N. Y.

PACKING—Hydraulic
Rhoads, J. E., & Sons, Philadelphia.
Schieren, Chas. A., Co., 30 Ferry St., N. Y. C.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Graton & Knight Co., Worcester, Mass.
Rhoads, J. E., & Sons, Philadelphia.
Schieren, Chas. A., Co., 30 Ferry St., N. Y. C.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

PAINT
Sherwin-Williams Co., Cleveland.

PERFORATED METAL
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chi.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
Custodis, Alphons, Chimney Construction Co., 135 William St., N. Y. C.

PICKLING TANK STEAM JETS
Durion Co., Inc., The., 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Cleveland Cliffs Iron Co., Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Republic Steel Corp., Youngstown, Ohio.
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe
National Tube Co., Pittsburgh.

PILING—Steel Sheet
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Pacific Coast Steel Corp., San Francisco, Calif.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. B. & J., Palmer, Mass.

PINS—Airbrake
Champion Rivet Co., Cleveland, Ohio.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co., Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Brklyn., N. Y.
Fisher Bros. Steel Corp., Morris Ave. & 139th St., Bronx.
Green Point Iron & Pipe Co., Inc., 187-197 Maspeth Ave., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co., Pittsburgh.
Pacific Coast Steel Corp., San Francisco, Calif.
Republic Steel Corp., Youngstown, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co., Pittsburgh.
Republic Steel Corp., Youngstown, Ohio.

PIPE CUTTING AND THREADING MACHINES
Jarecki Mfg. Co., Erie, Pa.
Landis Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE FITTINGS
Crane Co., Chicago
Jarecki Mfg. Co., Erie, Pa.

PIPE FITTINGS—For Welding
Taylor Forge & Pipe Works, Chicago.

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PIPE, STEEL—Rubber Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

PIPE & TUBE BENDING
Wallace Supplies Mfg. Co., Chicago.

PLANING MACHINES — Second-Hand. (See Clearing House Section)

PLANTS FOR SALE
McKay, Frank M., Trustee, Grigsby-Grunow Co., Inc., 5801 Dickens Ave., Chicago.

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Moulded
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.
Richardson Co., The, Melrose Park, Ill.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Philadelphia.
Carnegie Steel Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Heavy Steel (up to 25 in. thick)
Lukens Steel Co., Coatesville, Pa.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Philadelphia.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Lukens Steel Co., Coatesville, Pa.
Pacific Coast Steel Corp., San Francisco, Calif.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATES—Nickel-Clad Steel
Lukens Steel Co., Coatesville, Pa.

PLATES—Wide Steel (up to 199 in.)
Lukens Steel Co., Coatesville, Pa.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., Pontiac, Mich.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Geuder, Paeschke & Frey Co., Milwaukee.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Henry & Wright Mfg. Co., Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Coining
National Mchry. Co., Tiffin, Ohio.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.

PRESSES—Forging
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

PRESSES—Multiple Plunger
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

PRESSES—Power
Baird Mch. Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Henry & Wright Mfg. Co., Hartford, Conn.
Hyman, Joseph, & Sons, Phila.
Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
V & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

PRESSES—Trimming
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Magnetic Mfg. Co., 626 South 28th St., Milwaukee.

PULVERIZERS
Jeffrey Mfg. Co., The, Columbus, Ohio.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.
American Engineering Co., Philadelphia.
Elmes, Chas F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Vickers, Inc., 1420 Oakman Blvd., Detroit.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Power
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Rotary
Vickers, Inc., 1420 Oakman Blvd., Detroit.

PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Vacuum
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUNCHES—Ring Center
Allen, W. W., Tool & Machine, Cleveland.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—15th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Buffalo (N. Y.) Forge Co., 492 B'way.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
Niagara Machine & Tool Works, Buffalo, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Thomas Spacing Mach. Co., Pittsburgh.

PYROMETERS—Indicating
Bristol Co., The, Waterbury, Conn.
Hoskins Mfg. Co., Detroit, Mich.

RAIL SPICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Frank, M. K., 480 Lexington Ave., N. Y. C.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Robinson & Orr, Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.

RAILS—Relaying
Hyman-Michaels Co., Chicago.

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FERRO SILICON
ALL GRADES
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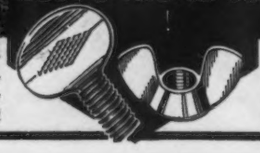

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Products Index

RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.

REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Hartford, Conn.

REFRACTORIES
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.
Massillon (Ohio) Refractories Co.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland.
Manville, E. J., Mch. Co., Waterbury, Ct.
National Mchry. Co., Tiffin, Ohio.

RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
Shuster, F. B., Co., The, New Haven, Ct.

RIVETS
Blake & Johnson Co., The, Waterville, Ct.
Champion Rivet Co., Cleveland, Ohio.
Clark Bros. Bolt Co., Millidale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn, N. Y.
Oliver Iron & Steel Corp., Pittsburgh.
Progressive Mfg. Co., Torrington, Conn.
Ryerson, Jos. T., & Son, Inc., Chicago.

RODS—Aluminum
Aluminum Co. of America, Pittsburgh.

RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

RODS—Nickel Silver
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Seymour (Conn.) Mfg. Co.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Chicago.
Champion Rivet Co., Cleveland.
Lincoln Electric Co., The, Cleveland.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Wire
American Steel & Wire Co., Chicago.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

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Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.
National Roll & Fdry. Co., Avonmore, Pa.
United Engineering & Fdry. Co., Pitgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Sand Chilled Iron and Steel
Hyde Park (Pa.) Fdry. & Mach. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Pitgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, Ohio.
American Sheet & Tin Plate Co., Pitgh.
Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Iron and Steel
Newport (Ky.) Rolling Mill Co., The.

ROOFING AND SIDING—(Zinc) Corrugated and Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

RUBBER LININGS—Tank
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., Akron, Ohio.

RUBBER MOLDED PARTS
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

RULES & CALIPERS
Johnson, E. P., Rule Mfg. Co., Chicago, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

RUST REMOVING
American Chemical Paint Co., Ambler, Pa.
Nukem Products Corp., 68 Niagara St., Buffalo.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., Mishawaka, Ind.
Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O., & Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Wells Mfg. Co., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SCALES
Fairbanks, Morse & Co., Chicago.

SCREENS—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chi.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace, Co., The, Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Cleveland (Ohio) Cap Screw Co., The.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven, Conn.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.
Weatherhead Co, The, Cleveland

SCREW MACHINERY—Automatic
Cone Automatic Mach. Co., Inc., Windsor, Vt.

SCREW MACHINERY—Hand
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

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Cone Automatic Mach. Co., Inc., Windsor, Vt.

SCREW STOCKS
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Bristol Co., The, Waterbury, Conn.
Cleveland (Ohio) Cap Screw Co., The.
Ottemiller Wm. H., Co., Inc., York, Pa.

SCREWS—Cold Headed
Cleveland (Ohio) Cap Screw Co., The.

SCREWS—Machines
Blake & Johnson Co., The, Waterville, Ct.
Progressive Mfg. Co., The, Hartford, Conn.

SCREWS—Safety Set
Bristol Co., The, Waterbury, Conn.
Progressive Mfg. Co., The, Hartford, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Bristol Co., The, Waterbury, Conn.
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS, Socket, Head, Cap
Bristol Co., The, Waterbury, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y. C.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N. Y.

SECOND-HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milwaukee.
Magnetic Mfg. Co., 626 South 28th St., Milwaukee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

SHAFTING—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Steel
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Moltrup Steel Prods. Co., Beaver Falls, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical
Pratt & Whitney Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A., Sons Co., Trenton, N. J.

SHEARING MACHINES—Alligator
Canton (Ohio) Fdry. & Mch. Co.

SHEARING MACHINES—Angle, Hand and Power
Buffalo (N. Y.) Forge Co., 492 Broadway.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
Buffalo (N. Y.) Forge Co., 492 Broadway.
Schatz Mfg. Co., The, Poughkeepsie, N.Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Beam and Channel
Buffalo (N. Y.) Forge Co., 492 Broadway.
Schatz Mfg. Co., The, Poughkeepsie, N.Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Billet
Buffalo (N. Y.) Forge Co., 492 Broadway.
Morgan Engineering Co., The, Alliance, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES, Plate
Bertsch & Co., Cambridge City, Ind.
Buffalo (N. Y.) Forge Co., 492 Broadway.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—15th St., Hammond, Ind.
Buffalo (N. Y.) Forge Co., 492 Broadway.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N.Y.

SHEET BARS
Andrews Steel Co., The, Newport, Ky.
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mech. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Republic Steel Corp., Youngstown, Ohio
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Lukens Steel Co., Coatesville, Pa.
Newport (Ky.) Rolling Mill Co., The.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
American Sheet & Tin Plate Co., Pgh.

SHEETS—Chrome Nickel
American Sheet & Tin Plate Co., Pgh.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh.
Continental Steel Corp., Kokomo, Ind.
Inland Steel Co., Chicago.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago.

SHEETS—Copper Steel
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.

SHEETS — Enameling
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Pacific Coast Steel Corp., San Francisco, Calif.

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Republic Steel Corp., Youngstown, Ohio.
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SHEETS—Long Terne
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Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
American Sheet & Tin Plate Co., Pitgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—Pickled
American Sheet & Tin Plate Co., Pitgh.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.
Weirton (W. Va.) Steel Co.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pitgh.
Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.

SHEETS—Zinc
New Jersey Zinc Co., Inc., The, 160 Front St., N. Y. C.

SHOES—Horse and Mule
Burden Iron Co., Troy, N. Y.

SLABS
Andrews Steel Co., The, Newport, Ky.
Central Iron & Steel Co., Harrisburg, Pa.

SLINGS—Wire Rope
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Nazel Engng. & Mch. Wks., Philadelphia.

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Thomas Spacing Mach. Co., Pittsburgh.

SPECIAL MACHINERY
Allen, W. W., Tool & Machine, Cleveland.
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bullard Co., The, Bridgeport.
Conran, Frederick M., 107 Colden St., Newark, N. J.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

SPEED REDUCERS
Boston Gear Wks., Inc., North Quincy, Mass.
Link-Belt Co., Chicago.
Michigan Tool Co., Detroit.
Philadelphia (Pa.) Gear Works.

SPIKES—Track
Ames, W., & Co., Jersey City, N. J.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

SPINDLES—Grinding
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

SPLICE BARS
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

SPONGE IRON
Ekstrand & Tholand, Inc., 441 Lexington Ave., N. Y. C.

SPRAYERS—Metal
Metallizing Co. of America, Inc., Los Angeles, Calif.

SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Car
American Steel & Wire Co., Chicago.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co., Chicago.
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Cook Spring Co., Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
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Hubbard, M. D., Spring Co., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
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Raymond Mfg. Co., Corry, Pa.
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Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Whitney Mfg. Co., Hartford, Conn.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Spring Co. Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dunbar Bros., Co., Bristol, Conn.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass
Geuder, Paeschke & Frey Co., Milwaukee.
Gibson, Wm. D., Co., Chicago.
Hubbard, M. D., Spring Co., Pontiac, Mich.
Lansing (Mich.) Stamping Co., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
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Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

STAPLES—Wire
Continental Steel Corp., Kokomo, Ind.
Wickwire Brothers, Cortland, N. Y.

STAPLING MACHINES
Bates Mfg. Co., The, 30 Vesey St., New York City.

STEEL—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carnegie Steel Co., Pittsburgh.
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Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, Ohio.
Universal Steel Co., Bridgeville, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn
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Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Bright Finished
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
Andrews Steel Co., The, Newport, Ky.
Carnegie Steel Co., Pittsburgh.
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Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Andrews Steel Co., The, Newport, Ky.
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STEEL—Chrome
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
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Wyckoff Drawn Steel Co., Pittsburgh, Pa.

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Griffin Mfg. Co., Erie, Pa.
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Thomas Steel Co., Warren, Ohio.

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Thomas Steel Co., Warren, Ohio.

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Acme Steel Co., Chicago.
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American Steel & Wire Co., Chicago.
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Vanadium-Alloys Steel Co., Latrobe, Pa.

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Ludlum Steel Co., Watervliet, N. Y.
Universal Steel Co., Bridgeville, Pa.

STEEL—Die

Andrews Steel Co., The, Newport, Ky.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Universal Steel Co., Bridgeville, Pa.

STEEL—Drill

Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Pacific Coast Steel Corp., San Francisco, Calif.
Universal Steel Co., Bridgeville, Pa.

STEEL—Electric

Disston, Henry, & Sons, Inc., Philadelphia.
Inland Steel Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed

Bethlehem (Pa.) Steel Company.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Universal Steel Co., Bridgeville, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips

Acme Steel Co., Chicago.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Pgh.
Weirton (W. Va.) Steel Co.
West Leechburg Steel Co., Pittsburgh.

STEEL—Hot Rolled Strips, Electro Zinc Coated

Thomas Steel Co., Warren, O.

STEEL—Hot Rolled Strips, Galvanized

Acme Steel Co., Chicago.

STEEL—Magnet

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Latrobe (Pa.) Electric Steel Co.

STEEL—Nickel

Andrews Steel Co., The, Newport, Ky.

STEEL—Open Hearth

Andrews Steel Co., The, Newport, Ky.
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Rustless

Acme Steel Co., Chicago.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Screw

Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis

Andrews Steel Co., The, Newport, Ky.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Youngstown, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
West Leechburg Steel Co., Pittsburgh.

STEEL—Spring

Athenia Steel Co., 135 William St., N. Y.
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Gibson, Wm. D., Co., Chicago.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Stainless

Acme Steel Co., Chicago.
American Rolling Mill Co., Middletown, O.
American Steel & Wire Co., Chicago.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Disston, Henry, & Sons, Inc., Philadelphia.
Illinois Steel Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad

Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool

Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Universal Steel Co., Bridgeville, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Tool, Special Shapes

Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Co.

STEEL—Vanadium

Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.
Universal Steel Co., Bridgeville, Pa.

STEEL PLANTS AND ROLLING MILLS

Perin Engineering Co., Inc., 535 Fifth Ave., N. Y. C.

STEEL ROLLS

United Engineering & Fdry. Co., Pgh.

STOCKS AND DIES

Jones & Lamson Mch. Co., Springfield, Vt.

STOPS—Crane Limit

Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube

Conran, Frederick M., 107 Colden St., Newark, N. J.
Medart Co., The, St. Louis, Mo.

STRAIGHTENING MACHINES—Wire

Lewis Mch. Co., The, Cleveland.

STRAPPING—Box

Acme Steel Co., Chicago.

STRUCTURAL IRON AND STEEL WORK

American Bridge Co., Pittsburgh.
Mo.an Engineering Co., The, Alliance, Ohio.

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SUB PRESSES

Danly Machine Specialties, Inc., Chicago.

SWAGING MACHINES

Torrington (Ct.) Co.

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Westinghouse Elec. & Mfg. Co., East Pgh.

TANK LININGS—Rubber

American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., Akron, Ohio.

TANKS—Compressed Air, Gas, Oil and Water

Scaife, Wm. B., & Sons Co., Pgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Elevated Wood

Hauser-Stander Tank Co., The, Cincinnati, Ohio.
Woolford, G., Wood Tank Mfg. Co., Phila.

TANKS—Iron and Steel

Scaife, Wm. B., & Sons Co., Pgh.

TANKS—Lead Lined

Hauser-Stander Tank Co., The, Cincinnati, Ohio.
Woolford, G., Wood Tank Mfg. Co., Phila.

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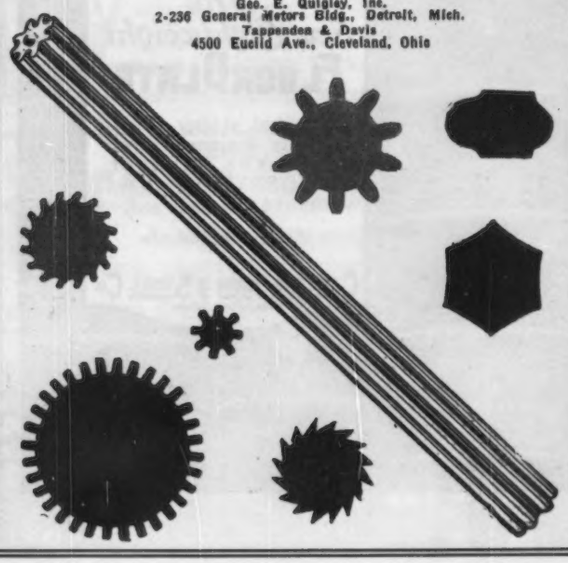

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TANKS—Pickling
American Hard Rubber Co., 11 Mercer St., N. Y. C.
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Custodis, Alphons, Chimney Construction Co., 135 William St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.
Nukem Products Corp., 68 Niagara St., Buffalo.
Woolford, G., Wood Tank Mfg. Co., Phila.

TANKS—Rubber Lined
American Hard Rubber Co., 11 Mercer St. N. Y. C.
Blaw-Knox Co., Pittsburgh.
Goodrich, B. F., Co., The, Akron, Ohio.
Woolford, G., Wood Tank Mfg. Co., Phila.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co., Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Barnes Drill Co., Rockford, Ill.
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

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National Mchry. Co., Tiffin, Ohio.

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Murchey Machine & Tool Co., Detroit.

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Weirton (W. Va.) Steel Co.

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Continental Steel Corp., Kokomo, Ind.

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Republic Steel Corp., Youngstown, Ohio.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Wean Engineering Co., Inc., The, Warren, Ohio.

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TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Carpenter Steel Co., 121 W. Bern St., Reading, Pa.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Pratt & Whitney Co., Hartford, Conn.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
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Blaw-Knox Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

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TUBES—Nickel Silver
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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

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TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Flexible Metallic
Bissett Steel Co., The, Cleveland.

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American Hard Rubber Co., 11 Mercer St., N. Y. C.

TUBING—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Steel & Tubes, Inc., Cleveland.

TUBING—Open Seam
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
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Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
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TUBING—Seamless Steel
National Tube Co., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Sons, Inc., Chicago.
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Timken Roller Bearing Co., The, Canton, Ohio.
Timken Steel & Tube Co., The, Canton, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

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Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
Steel & Tubes, Inc., Cleveland.

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National Tube Co., Pittsburgh.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

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Steel & Tubes, Inc., Cleveland.
Wallace Supplies Mfg. Co., Chicago.

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Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

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Morse Twist Drill & Mch. Co., New Bedford, Mass.

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Crane Co., Chicago.
Vickers, Inc., 1420 Oakman Blvd., Detroit.
Wood, R. D., & Co., Philadelphia.

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Jenkins Bros., 80 White St., N. Y. C.

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Nukem Products Corp., 68 Niagara St., Buffalo.

VISES
Jarecki Mfg. Co., Erie, Pa.

WASHERS—Iron or Steel
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WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Schieren, Chas. A., Co., 30 Ferry St., N. Y. C.

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Spring Washer Industry.

WASHERS—Spring
Spring Washer Industry.

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Thomson-Gibb Elec. Welding Co., Lynn, Mass.
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Metal & Thermit Corp., 120 B'way, N. Y. C.

WELDING CONTACTS—Spot, Flash & Seam
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

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WELDING MACHINES—Electric Arc
Adams, J. D., Co., Dept. I, Indianapolis, Ind.
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Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland.
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Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Spot
Eisler Engineering Co., Inc., 754 S. 13th St., Newark, N. J.
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Illinois Steel Co., Chicago.

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WIRE—Barb
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Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.

WIRE — Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Globar Corp., Niagara Falls, N. Y.

WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co., Chicago.
Barnes, Wallace Co., The, Bristol, Conn.
Continental Steel Corp., Kokomo, Ind.
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Pacific Coast Steel Corp., San Francisco.
Page Steel & Wire Co., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
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Webb Wire Works, New Brunswick, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—High Carbon
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WIRE—Insulated
American Steel & Wire Co., Chicago.
Roebling's, John A., Sons Co., Trenton, N.J.

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Roebling's, John A., Sons Co., Trenton, N.J.

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Roebling's, John A., Sons Co., Trenton, N.J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
New England High-Carbon Wire Co., Millbury, Mass.
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Special, Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spoke and Crimping
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring
American Steel & Wire Co., Chicago.
Barnes, Wallace, Co., The, Bristol, Conn.
Jones & Laughlin Steel Corp., Pittsburgh.
New England High-Carbon Wire Co., Millbury, Mass.
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N.J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Stainless Steel
Page Steel & Wire Co., Monessen, Pa.

WIRE—Steel
Wickwire Brothers, Cortland, N. Y.

WIRE—Welding
Adams, J. D., Co., Dept. I, Indianapolis, Ind.
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Steel & Wire Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Metal & Thermit Corp., 120 B'way, N. Y. C.
Page Steel & Wire Co., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N.J.
Ryerson, Jos. T., & Son, Inc., Chicago.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE CLOTH
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Michigan Wire Cloth Co., 2117 Howard St., Detroit, Mich.
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Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL MACHINERY AND EQUIPMENT
Sleeper & Hartley, Inc., Worcester, Mass.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

WIRE NAIL MACHINERY
National Mchry. Co., Tiffin, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co., Chicago.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co., Chicago.
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Roebling's, John A., Sons Co., Trenton, N.J.
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1— 5-Ton Universal Crane, ⅜ yard Williams Bucket, Gas Driven Motor, mounted on White Truck				3,500
1—50-Ton Industrial Bay City Wreck Crane				4,500
1—15-Ton Browning Loco. Crane—Motor—8 wheels				2,000
1—10-Ton Brown Loco. Crane—4 wheels				1,250
1—No. 6 Quickwork Shear D. C. Motor 30 H.P., 48" Throat, 1" metal				2,500
1—Long & Allistater Angle Shear—A.C. Motor —15 H.P., 6" x 6" x 1" sq. or mitre—22 strokes per min.				1,750
2—Norton Grinders 10" x 24" and 10" x 36"				350
1—Thomas Hoist—2 drum & swinger D.C. Motor 45 H.P.				875

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Cars and Locomotives of all types.

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Ry. Exchange Bldg. St. Louis, Mo.
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D.C. Generators	Electrical Instruments
Motor Generators	Switchboards & Meters

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NEW-USED-UNTESTED
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All Types and Sizes
Rebuilt-Guaranteed

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Any Quantity

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1—8' Newbold Gate Shear 1" capacity.
1—Hillis & Jones Beam Punch.
1—Lamb & Nash 22" Slitter 10 gauge, AC motor.
1—36"x10" Newark Spur Gear Cutter.
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SEALED BIDS will be received by the Board of Water Supply, at its offices, eleventh floor, 346 Broadway, New York, N. Y., until 10 A. M., Eastern Standard time, on Tuesday, October 8, 1935, for the sale of approximately 860,000 pounds of structural and other steel now stored on lands of the City of New York at the northerly end of the Hill View reservoir, near Central Park avenue, Yonkers, New York. For further particulars, see advertisement in *City Record*. GEORGE J. GILLESPIE, President; HENRY HESTERBERG, Commissioners of the Board of Water Supply. BENJ. F. EINBIGLER, Secretary.

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100 Tons	Good Used	Cast Iron	Water Pipe:
805 ft.	12 in.		12'0"
2 pcs.	48 "		6'0"
1 pc.	48 "		6'0"—Bell End
11 pcs.	48 "		12'0" " "
2 pcs.	48 "	(New)	12'0" " "
1 pc.	36 "		12'0" " "
1 pc.	24 "		12'0"—Flanged both ends
1 pc.	30 "		12'0"—Bell End

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1—23x14x16 Bury, 2 stage motor driven air compressor, 1720 cu. ft., 100 lb. air pressure, driven by:
1—300 H.P. Westinghouse, 3/60/2200 volts Synchronous Motor.
Practically new.

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Koppers Building, Pittsburgh, Pa.

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10,000	¾x4½	Carriage Bolts .....85% off list
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100,000	⅝x1½	F. H. Stove Bolts ....90% off list
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36" and 45" Lifting Magnets.
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300 amp. Lincoln Arc Welder.
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100 H.P. G.E. Slip Ring Motor.
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10 TON TRAVELING CRANE

Mfd. by Box Crane & Hoist Corp.
Span 22', Motors 3 Phase, 60 Cycle, 440 Volts,
Floor Operated
Operated less than two years.

MIDLAND STEEL & EQUIPMENT CO.
400 S. Clinton St. Chicago, Ill.

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We buy rails fit to relay

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WANTED

WANTED

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1—Motor Driven Bar Straightener for 3 x 3 angles

ADDRESS BOX R-99

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Wire Drawing Equipment

5/8" Maximum Capacity

ADDRESS BOX R-100

Care *The Iron Age*, 239 W. 39th St., New York

1—Synchronous Motor Generator Set, consisting of—

1 Motor 1500 H.P. approximately, 3 Phase, 25 Cycle, 660 Volts.

1 D.C. Generator 750 to 1000 K.W., 550 Volts or 230 Volts.

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On all D.C. equipment, voltage preferred is 550 Volts. Ward-Leonard Control desired for all equipment.

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BUSINESS OPPORTUNITIES

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., Sept. 19, 1935.—Sealed bids in duplicate will be publicly opened in this office at 1 p.m., Oct. 24, 1935, for furnishing all labor and materials and performing all work for the construction of the U.S.P.O. at Van Nuys, Calif. Attention is directed to the special conditions of bidding set forth in the specifications, and bulletin no. 51 of the Federal Emergency Administration of Public Works as modified by the specification. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $10 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U.S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch.

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., Sept. 13, 1935.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., Oct. 21, 1935, for furnishing all labor and materials and performing all work for construction of "B" Postal Sta., U.S.P.O. (except elevator), New York, N. Y. Attention is directed to the special conditions of bidding set forth in the specifications, and bulletin no. 51 of the Federal Emergency Administration of Public Works. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $10 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch.

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1 page	128.00	128.00	124.00	120.00	108.00	100.00

TREASURY DEPARTMENT, Procurement Division, Public Works Branch, Washington, D. C., Sept. 13, 1935.—Sealed bids, in duplicate, will be publicly opened in this office at 10 a.m., Oct. 8, 1935, for furnishing all labor and materials and performing all work for the following: The manufacturing and installing of Plant Industry Scientific Laboratory Equipment; also miscellaneous building changes, etc., in the Extensible Bldg., of the U.S. Dept. of Agriculture in Washington, D. C. Attention is directed to the special conditions of bidding set forth in the specification. Upon application, two (2) sets of drawings and specifications will be supplied free to each general contractor, or equipment manufacturer, interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of ten (10) dollars per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer of the U. S. W. E. Reynolds, Assistant Director of Procurement, Public Works Branch.

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Profit by using
THE CLASSIFIED SECTIONS
of The Iron Age

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NORTH WALES MACHINE CO., INC.
Phone 323 North Wales, Montg. Co., Pa.
22 Miles from Philadelphia, Pennsylvania

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1 lb. to 2000 lbs.
Capacity 16,000 lbs. per day
OUR SPECIALTIES
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Established 1850

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Care *The Iron Age*, 239 W. 39th St., New York

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HELP WANTED

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METALLURGIST, 10 years' experience. Particularly well qualified in TOOL STEEL METALLURGY. Background of technical education, steel mill, and manufacturing plant experiences. Has supervised the chemical, metallurgical, and physical testing laboratories maintained by a large user of tool steels. Address Box R-111, care *The Iron Age*, 239 W. 39th St., New York, N. Y.

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Employment Service rates same as above.

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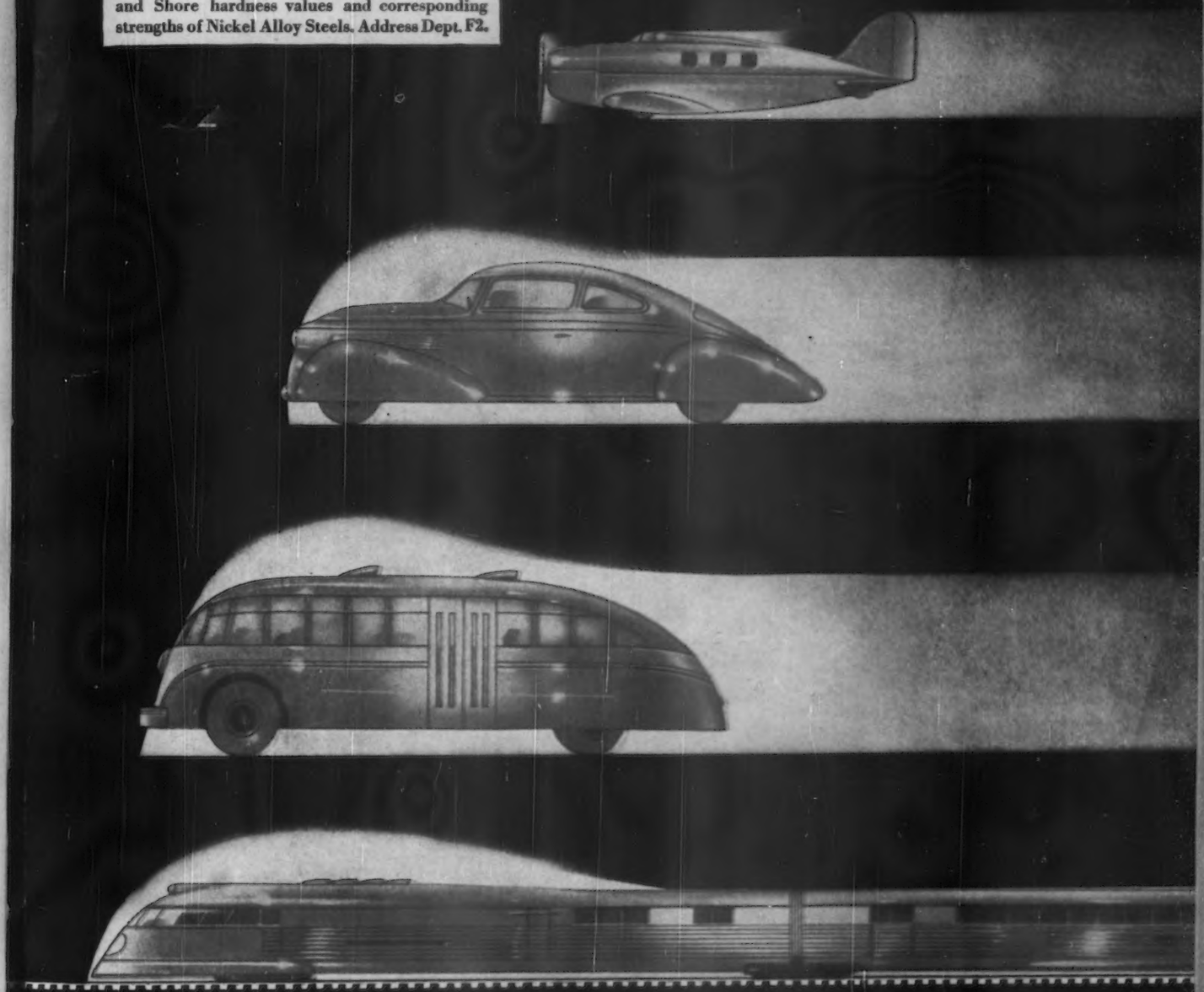

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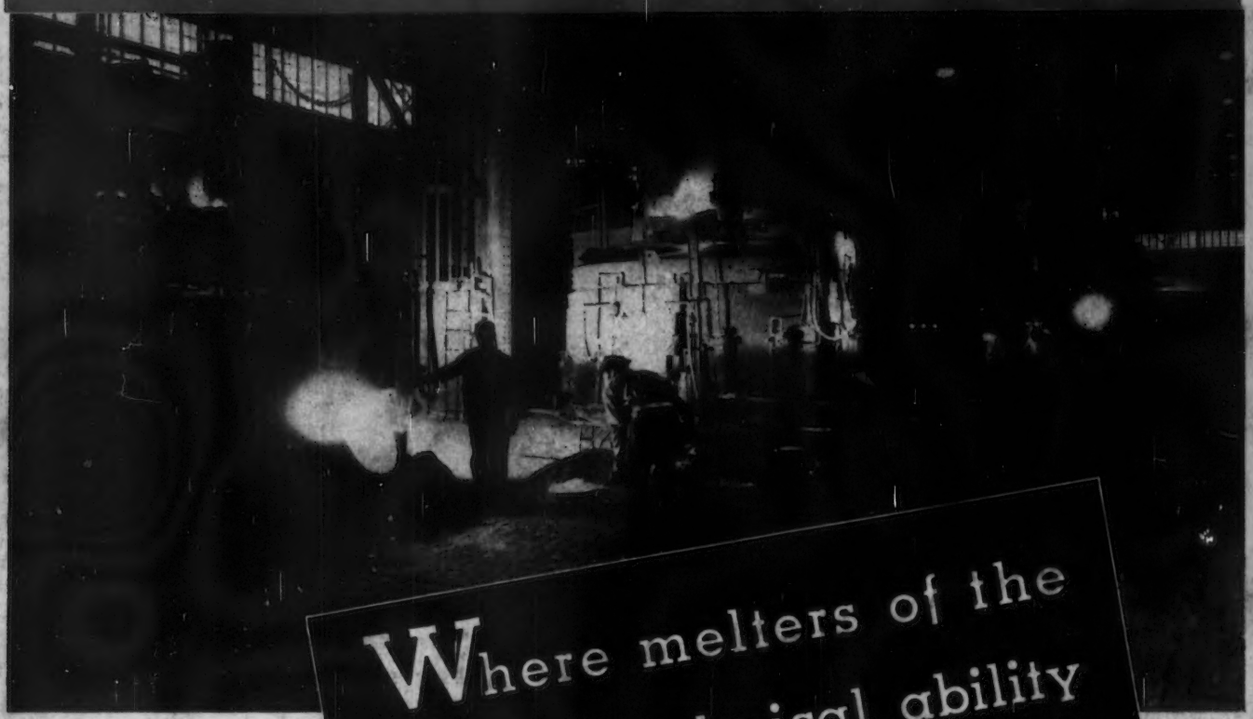

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